# PERSONALITIES

By George F. Taubeneck

## Interviewer Interviewed

Plenty of heavy thinking was going on in the Palmer House, Chicago, last week. Nema—short for National Electrical Manufacturers Association—was meeting there. For four days the chief executives of practically all electrical products manufacturers of any consequence deliberated the present progress and future progress of the manifold interrelated branches of the electrical industry.

GEORGE HUGHES, the father of the electrical range, was one of the first men we saw at the sessions. Mr. Hughes, who is president of Edison General Electric Appliance Co., manufacturer of Hotpoint electrical appliances, has been making and selling electric ranges for more than a quarter of a century, and undoubtedly is ultimately responsible for the major portion of all electric ranges in use today.

Well along in the evening of life, Mr. Hughes looks with considerable satisfaction in retrospect upon turbulent years which he considers well spent. Unique among pioneers—most of whom sit back in the later years and watch others make profits from the inventions which they launched—Mr. Hughes is a wealthy man. His winter home in Coral Gables, Fla., is quite the most luxurious and conveniently equipped household in which this writer has ever been entertained.

While talking to Mr. Hughes in the Palmer House last Wednesday we caught a glimpse of President GEORGE MASON of Kelvinator, President HOWARD BLOOD of Norge, and HALDEMAN FINNIE, manager of the Refrigeration Division of Nema, rushing by to attend a meeting.

Later in a hallway we ran into President E. G. BIECHLER and W. F. ARMSTRONG of Frigidaire. No sooner had we finished exchanging greetings with this pair than we found Vice President A. E. ALLEN and Merchandising Manager ROSCOE IMHOFF of Westinghouse (Mansfield) conferring very seriously, indeed, in a room all by themselves.

Then we found a flock of refrigeration industry executives all at once—in fact, it amounted to a Who's Who in Electric Refrigeration. Among the prominent men we talked with, lunched with, and photographed were: P. B. ZIMMERMAN, manager of General Electric's specialty appliance department; HENRY BURRITT, vice president in charge of sales, and "DOC" HARLAN, commercial sales manager of Kelvinator (Mr. Harlan is also chairman of the Commercial Section of the Refrigeration Division of Nema); Vice President LEWIS CROSLEY of Crosley Radio Corp.; LOUIS RUTHENBURG, president of Servel; JOHN KNAPP, vice president in charge of sales for Norge; W. PAUL JONES, vice president of Fairbanks-Morse Home Appliances; CHARLES GIBSON, president of Gibson Electric Refrigerator Corp.; CHARLES D'OLIVE, assistant to the president, and JOHN DITZELL, general sales manager of Stewart-Warner; FRANK PIERCE, sales manager of Frigidaire; P. Y. DANLEY, manager of the refrigeration and air-conditioning department, and RAY COSGROVE, manager of household refrigeration sales of Westinghouse; W. A. CARSON, president and general manager, and J. H. SCHROEDER, vice president and sales manager of Sunbeam (manufacturer of the Sears, Roebuck unit); H. M. JOHNSTON, treasurer of Sparks-Withington; and F. S. McNEAL, general manager, and TOM PENDERGAST, Universal Cooler Corp.

To tell you the truth, we didn't bring back much news. The interviewer was interviewed. A good many of these gentlemen were interested in our forthcoming trip around the world, and made a number of practical suggestions. Others had comments about the series of articles we have been running on JOHN PATTERSON'S selling methods, and either told us stories about Patterson we hadn't heard, or told us where we could get some.

* * *

## Teetotaler

For instance, H. M. JOHNSTON, treasurer of Sparks-Withington Co. (manufacturer of Sparton radios, refrigerators, and automobile horns), recalls having been in Battle Creek, Mich., when Mr. Patterson was making his regular visits to the Kellogg Sanitarium there.

Principle precept of the Kellogg Doctrine was: don't eat meat. Patterson subscribed to that heartily, and recommended the practice of vegetarianism strongly—if not threateningly—to his associates.

Many, many times Patterson came to the Kellogg menage, frequently bringing employees and associates with him. And because the establishment rarely made ends meet (in contrast to the branch of the family headed by W. K. Kellogg, which made a fortune out of breakfast foods), Patterson was a heavy contributor to its upkeep, Mr. Johnston remembers.

Patterson's objections to alcohol and tobacco were well known—particularly to his employees! Mr. Johnston reports the story (relayed to him by a former N.C.R. man) of the time Patterson met two N.C.R. salesmen in the lobby of a Dayton hotel early one morning during a "100 Point Club" convention. The boys were inebriated.

Disgusted and incensed by their loud mouthings, Patterson asked, bluntly:

"Do you fellows have jobs?"

"Yesh, shir," he was answered, "we work f'r the Nashnal Cash Rezhtur cumpny."

"You mean, you *did* work for the National Cash Register Co.," snorted Patterson, turning on his heel.

* * *

## Simple Bookkeeping

Complicated bookkeeping was anethema to John Patterson. He was not the kind of man who ran a business by checking columns of figures. His only questions with regard to the company's financial position were:

"How much have we in the bank? What were our sales?. How much do we owe? How much are we owed?"

That was all he wanted to know. Yet the National Cash Register Co. consistently and persistently operated in the black, and Patterson made plenty of money for himself and his associates.

CHARLES STEFFEY, vice president in charge of sales for Nu-Enamel, Chicago paint and varnish manufacturing concern, tells a story about the time Patterson returned from abroad to find a number of strange men going around the plant making time studies. During his absence those he had left in charge had installed a crew of efficiency experts.

"Who are you?" he asked one of them.

"I'm an efficiency expert," replied the man, proudly. "Our organization is engaged in a minute study of your plant with a view toward stepping up the production of all your employees."

"Is that so?" queried Patterson, rhetorically but interestedly. "How are you getting along?"

"Fine," answered the expert. "We're practically finished."

"Well, well, now, you get all your men together, and have them meet me here with all the information they have worked out."

The efficiency man followed instructions, and presently the whole crew was assembled around Patterson, heavily laden with bulging brief cases, voluminous reports, stacks of statistics, and comprehensive charts.

"Follow me," commanded Patterson, and the big parade began.

Greatly to the surprise of the "experts," who had supposed that their Big Moment had arrived, the parade ended up in the boiler room.

"Now!" said Patterson to the expert who was packing the biggest load of figures and charts, "you take all those papers and stuff them in that furnace over there!"

Protests were of no avail, and one by one the corps of efficiency men marched to the furnace and dumped the results of their labors into its fiery maw.

They were paid off in full, but like the Mr. Foster (of the nursery rhyme) who went to Gloucester, they "never went there again."

* * *

## No Soldiering

Mickey Farrell, who was once a member of John Patterson's window display department at N.C.R. and who is now director of window displays for Frigidaire Corp., tells an illustrative story about the time Mr. Patterson returned from a trip to Europe and walked unexpectedly into the N.C.R. window display department.

"Well, boys, well, now," began Mr. Patterson in the soft, mild semi-stuttering monotone which was so peculiarly his own, "now, now, let me see, now, now, just what you've got ready, uh, around here, uh, to show me."

For at least one reason which he considered good, the manager of the department did not at all want to show to Mr. Patterson the posters his staff had designed.

Mr. Patterson had always insisted that window displays and posters be exceedingly plain and devoid of arty flourishes and decorations.

"Just tell the story, and quit," he'd admonish the boys. "Don't distract the eye with a bunch of fancy curlycues or colored monkey business."

During Mr. Patterson's absence, however, the long bound and cramped artistic instincts of the display department began to come out into the sunlight of their supposed new freedom. Result was that a new series of displays designed to "knock their eyes out" was all ready for shipment to the field.

The departmental manager wanted those displays to go out and be tested as to their pulling power, confident that the results would prove to Patterson the desirability of dressing up N.C.R. displays.

Hence he ordered Mickey Farrell, over the latter's protest, to bring out old display material.

Patterson adjusted his glasses, looked over the displays, and said nothing except "now, now, have you got any more?" a couple of times. It was obvious to Farrell that Patterson recognized the displays as old stuff.

At length he rose to his feet and inquired:

"Now, now, how many, uh, men have we in this department?"

"Five," answered the department head, and Farrell had visions of an executive order lopping five names off the payroll.

"Well, well, I'll expect 20 new display ideas tomorrow morning when I come down. That's four apiece. Good-day, gentlemen."

Turning out four brand new displays in 24 hours is no small task, even for an expert; but all five men came through, and next morning the haggard quintet showed 20 new designs to Mr. Patterson.

Promptly he ordered them to have 20 more ready the next morning. That was his answer to what had apparently been several months of soldiering on the part of an entire department.

* * *

## White Suit Demonstration

Frigidaire's Farrell also relates how Patterson cleaned up N.C.R. showrooms all over the country by half an hour of wriggling, and without saying a word.

One day Patterson walked into the New York showroom, and noticed that it needed cleaning up—and especially dusting—badly. He said nothing; but excused himself, and went back to his hotel.

In his hotel room he exchanged the dark blue worsted suit he had been wearing that morning for one of spotless white linen. Thus arrayed, he returned to the showroom.

As he talked to his men, he contrived to sit in the dustiest chairs and wriggle around so that he might dirty up his white suit. Seemingly still oblivious to the dirt, he would brush his arm carelessly over grimy counters, and all in all did a very effective job of making himself up like a chimney sweep.

"Mr. Patterson: your suit!" someone cried. "It's all dirty!"

"Well, well," responded Patterson, with a surprised air, "now, now, what do you know about that? I just put this suit on clean less than an hour ago. How do you suppose I could get that dirty?"

Within a half an hour the word had been passed—phoned from store manager to store manager, via the good old "underground telegraph" system which is so customary a part of life in a big corporation—to N.C.R. stores all around the nation that Mr. Patterson had got his clothes dirty in the New York showroom.

From that day henceforth N.C.R. showrooms were as spic and span as the kitchens presided over by the wooden-shoed woman with a stick in the Old Dutch Cleanser advertisements.

Never could tell, reasoned the store managers, when Patterson might walk in on them; and they wanted to take no chances on his dusting out their stores with a white linen suit.

Thus, without saying a word, Patterson made his point and achieved his object by the sheer power of his flair for dramatization.

## Touchdown! Touchdown!

John Knapp, Norge's vice president in charge of sales, believes that the Detroit Lions football machine works as smoothly as a Rollator. The editor's camera caught this exultant expression on his face when the Lions scored a touchdown after concerted team play of the variety Mr. Knapp likes to instill into Norge sales organizations.

(1) George Hughes, Hotpoint's president, was so interested in this copy of Electric Refrigeration News that he didn't even look up when the cameraman approached. (2) Vice President H. W. Burritt of Kelvinator, Sales Manager John Knapp of Norge, and C. R. D'Olive of Stewart-Warner talk over 1936 prospects. (3) Mr. D'Olive asks Charles Gibson of Gibson Electric Refrigeration Co. what his company has up its sleeve for next year. (4) Two of the best-known sales executives in the industry—Mr. Burritt, and Frank Pierce of Frigidaire.

(1) "Zeke" Carrithers, the News' new special representative, examines a ceiba pod, from which Dry-Zero insulation is made. (2) Louis Ruthenburg of Servel, W. A. Carson of Sunbeam, and J. A. Harlan of Kelvinator in a between-meetings session—and you can bet it's about refrigeration. (3) Charles Gibson of Gibson and P. Y. Danley of Westinghouse in another recess get-together. (4) H. M. Johnston of Sparks Withington Co., W. Paul Jones of Fairbanks-Morse, and Mr. Gibson can't forget about business—even at a banquet table.

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## Markland Head Of Univ. Cooler Household Sales

### *Former Kelvinator Sales Executive Takes Over Post Immediately*

DETROIT—H. E. Markland has been appointed domestic sales manager of Universal Cooler Corp., effective immediately, Frank S. McNeal, president, reported last week.

Mr. Markland was formerly assistant domestic sales manager of Kelvinator Corp. He joined that company in 1925 and was successively district manager, Midwest regional manager, head of the Cleveland branch, Philadelphia branch manager, and assistant domestic sales manager.

Universal Cooler's new domestic sales manager has been in sales work all his life. After serving in the Army during the war he joined an uncle who was distributor in Colorado for Pierce-Arrow and Hudson automobiles, and directed the firm during a period of his uncle's illness.

In 1921 he joined Harry Arnold, well-known Los Angeles automobile distributor, as manager of the truck department, leaving this concern in 1922 to become sales manager for the Detroit Flag & Mfg. Co., which position he held until he entered the refrigeration industry.

## *Directs Sales*

H. E. MARKLAND

## Dix-Bowers Distributes Lipman Equipment

NORFOLK, Va.—The Dix-Bowers Co. has been appointed distributor of Lipman refrigerating and air-conditioning equipment in this territory. The company will also handle a complete line of refrigerated display cases and coolers.

## *List Price 'Clearance Sales' and Special Bonuses To Salesmen Move Dallas Dealer's Stocks*

DALLAS—Selling old model electric refrigerators to make room for new ones is no stumbling block to Harry Secker, owner of the Knox Street and Modern Appliance Co. here, and his manager, H. A. Dubey.

"Clearance sales without clearance prices" is their motto. How do they do it? By a combination of three methods:

1. Bonuses to salesmen for selling specified units.

2. Calling on users and discovering the individualized needs of their friends, to turn up "tailor made" prospects for these units.

3. The use of premiums, in a limited way, as an inducement to prospects to buy certain models.

While the last-named method has been used sparingly, Mr. Dubey says, it has been found quite effective, in closing stubborn sales. The premium most sought is an electric mixer, which is "sold" along with the refrigerator, at no extra cost to the purchaser.

Best of the three plans, in the company's experience, has been the bonus to salesmen.

"We allow a specified sum on each refrigerator we want to sell," Mr. Dubey says, "and pay this amount to the salesman who disposes of it, over and above his regular commission.

"We make up a list of units which, for one reason or another, we especially want to sell. Opposite each unit, we put the amount of the bonus to be paid the man who sells it. Each salesman gets such a list—and it serves as a constant reminder to him to push these models."

These "clearance sales" are no last minute affairs, either. The company keeps a close tab on both its stock and its field—close enough to know, well in advance, when to begin moving its surplus models.

"We start our sales long before deadline," says Mr. Dubey. "That not only gives us plenty of time in which to clean out the older stock, but also gets away from the last-minute pressure which accompanies many season-end drives, and which works to the detriment of both salesmen and the firm."

By being able to do an unhurried selling job, salesmen can call on users, and get the names of prospect-friends who are interested in buying a unit the size of one of the specific models being pushed.

Suppose, for example, that the company has two or three large, two-door models on its close-out list. In working with users, the salesman inquires particularly for large families or boarding house operators who might be interested in buying an electric refrigerator.

In that way, specific prospects are

(*Concluded on Page 2, Column 4*)

## Dealer Helps Student in Salesmanship Class; Result Is 3 Sales

HUNTINGTON, Ind.—Helping a high school student prepare a talk on refrigeration for presentation to a class in salesmanship, C. W. Waterson of National Mill & Supply Co., and R. J. Myers of C & L Appliance Co., local Westinghouse dealer, did such a good job that three sales resulted.

Waterson and Myers are pioneering this type of sales promotion in Huntington, with the cooperation of George Eberhart, instructor in salesmanship at Huntington high school. Purpose of the plan is to teach the principles of salesmanship by using practical examples to back up theoretical textbook material.

The student, Don Brewer, delivered a sales talk on refrigeration to the class, using material and suggestions furnished him by the Westinghouse men. Mr. Myers, who heard the talk, said the youth's presentation was "worthy of the merchandising efforts put forth" on him.

But what pleased Mr. Myers most of all were the three sales which followed young Brewer's talk. Then he knew he'd been a good teacher.

## *Philadelphia Show Attracts 110,000*

PHILADELPHIA — Approximately 110,000 persons saw the eighth annual Electric and Radio Show sponsored by the Electrical Association of Philadelphia held at Convention Hall here Oct. 7 to Oct 12, reports George R. Conover, director of the exhibit.

Mr. Conover believes that final attendance figures will show a new record for the week.

A total of 108 companies exhibited their products in the 225 show spaces, which contained displays of refrigeration, air conditioning, heating, radio, and other industrial appliances and accessories.

Manufacturers represented included: Crosley, General Electric, Westinghouse, Stewart-Warner, Grunow, Sparton, Atwater-Kent, RCA Victor, Zenith, Emerson, American-Bosch, and Stromberg-Carlson.

Sales of radio sets on the floor of the show, reports Mr. Conover, were greater this year than at anytime since 1929.

Entertainment features at the show included music by Jesse Altmiller and his orchestra, talking pictures, and broadcasting. Feature of the display presented by Raymond Rosen Co., RCA distributor, was a robot checker player, which defeated every person against whom it played.

## *Auto Supply Firm Handles Kerotest Line in 3 Cities*

PITTSBURGH—The Kerotest Mfg. Co. here, manufacturer of refrigeration valves, fittings, and controls, has appointed the Andrae Auto Supply as jobber of its equipment in Madison, Milwaukee, and Green Bay, Wis. Substantial stocks will be carried at both the Madison and Milwaukee points.

## *Promoted*

JOHN S. GARCEAU

* * *

## Garceau Adds to Duties With Kelvinator Corp.

DETROIT—Appointment of John S. Garceau as advertising and sales promotion manager for the entire commercial products line of Kelvinator Corp. was announced last week by Sam C. Mitchell, director of advertising and sales promotion for Kelvinator.

In this position, Mr. Garceau will have charge of advertising and sales promotion for the following Kelvinator commercial products: standard commercial electric refrigeration equipment, liquid cooling, air conditioning, and automatic heating equipment.

Mr. Garceau has been with Kelvinator since 1927 in the advertising and sales promotion divisions. For three years he was domestic advertising and sales promotion manager. Last December he was appointed advertising and sales promotion manager for Kelvinator's new line of air-conditioning equipment.

Mr. Garceau also is well known throughout the country because of his direction of the Kelvinator exhibit at the Century of Progress in Chicago in 1933 and in 1934.

## *Georgia Power Contest Offers Prizes to Towns*

ATLANTA—Offering prizes to an entire community instead of to individuals is an innovation in contests to be used by the Georgia Power Co. in its $10,000 Home Town Electrical Contest, starting Friday, Nov. 1 and ending Oct. 31, 1936.

Prizes go to the towns making the best records in total use and increased use of electric service within the period of the contest.

Towns eligible to participate in the contest are incorporated towns, having 25 or more residential customers, which are supplied with electric service at retail by the Georgia Power

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## Knoxville Firms Sell 1,455 Units In Last 4 Mos.

### *Average Refrigeration Price Is $178.50; Appliance Sales Doubled*

KNOXVILLE, Tenn.—Sales of electrical appliances in Knox County between the months of June and October this year totaled more than $500,000, doubling the quantity sold during the same period last year, according to figures compiled by the Knoxville Electrical Dealers Association.

At the head of the list, in revenue production, were refrigerators, with sales of 1,455 for a total of $259,766.83, an average unit price of $178.50. Other appliance sales were reported as follows:

Electric ranges, 299 for a total revenue of $39,932; radios, 811 for a total of $38,037.44; washing machines, 591, for $40,730.35; ventilating systems, 70, for $7,322.60; water heaters, 90, for $8,130; vacuum cleaners, 162, for $9,101.23; portable lamps, 2,313, for $10,195; portable fans, 1,380, for $8,290.

## Survey of Utilities Shows Refrigerator Sales Up This Year

NEW YORK CITY—Gains of approximately 30 per cent in electric refrigerator sales by both power companies and independent dealers during the first six months of 1935 are estimated in a detailed statistical analysis of power company merchandising recently made by *Electrical World*.

The survey covers more than 100 power companies in all parts of the country, together with estimates made by these organizations of sales by dealers in their territories. In all, the study embraces more than 10,000,000 consumers on power companies' lines, or about half the connected residence customers of the industry.

Although power companies increased their sales in the neighborhood of 30 per cent over the first six months of 1934, the survey showed that these organizations were still doing only about 20 per cent of the total business in electric refrigerators. The other 80 per cent, by the power companies' own estimates, went to independent dealers, distributors, and department stores.

Power company sales of refrigerators for the six-month period were 89,712 units, compared with a total of 69,506 for the same months last year, a gain of 20,206.

While the utilities were registering this increase, however, independent dealers' totals rose 64,114 units, going from 234,302, the figure for the first half of 1934, to 298,416 for the same period this year.

The gain in sales among both

(*Concluded on Page 2, Column 2*)

## *Studious, Industrious Attitude Marks Conference of Refrigeration Industry's Top Executives*

**These are the first photographs ever taken of the Refrigeration Division of Nema (National Electrical Manufacturers Association) in actual session. Note intensely serious, concentrated attitude of the group. (1) Left to right, around the table: Lewis Crosley, Crosley; Henry Burritt, Kelvinator; Frank Pierce, Frigidaire; Haldeman Finnie, manager of the Division; H. M. Johnston, Sparks-Withington; Ray Cosgrove, Westinghouse; John Knapp, Norge; George Mason, Kelvinator. (Too little of the gentleman behind Mr. Cosgrove can be seen for identification). In the second picture Thomas Evans, Merchant & Evans, chairman of the Division, appears at the head of the table, on the extreme right. Other men in the picture are in the same seats as first picture.**

## 8 G-E Distributors Crack Quota in Fall Refrigerator Contest

CLEVELAND—Eight General Electric distributors already have exceeded 100 per cent of their entire quota for the "Stock Market" campaign, reports Jean DeJen, campaign manager for General Electric Co.'s specialty appliance department.

The eight distributing firms who so far have passed their entire quota are: George Patterson, Inc., St. Petersburg, Fla., leading with 153 per cent of quota; George Belsey Co., Ltd., Los Angeles; General Electric Supply Corp., Portland; B. K. Sweeney, Denver; National Electrical Supply Co., Washington, D. C.; Judson C. Burns, Philadelphia; W. L. Thompson, Inc., Boston; Electric Appliances, Inc., Indianapolis.

Burns, who started the campaign at the bottom of group 8, now is leading that group of distributors. National Electrical Supply Co. has jumped from fourth to first place in group 2. Bard & Barger, Columbus, Ohio, recaptured first place from A. Wayne Merriam, Schenectady, in group 5. Electrical Housekeeping, Inc., Omaha, has taken first place in group 10.

In the national competition between G-E division managers, in the sales drive, George Kobick, manager of the apartment house division, is leading the race by a wide margin.

## 35,000 People Inspect Westinghouse Plant On 'Family Day'

EAST PITTSBURGH—More than 35,000 persons took advantage of the open house held at the Westinghouse plant here, on its recent "Family Day" celebration. Included among this number were families of employees, their guests, and the general public.

Tours through the production departments, exhibitions of products, demonstrations of artificial lighting, research phenomena, and similar industrial achievements were subjects of interest.

Visitors were shown the machinery used in fabricating equipment, devices for balancing rotors to within one-thousandths of an ounce, and machine tools used to pare down metal within limits of one-ten thousandth of an inch.

In the production aisles an 82,500 kv-a generator for Boulder Dam, motors, and controls for operating new steel mills for the Bethlehem Steel Co., and the La Clede Steel Co., railway, and motors and equipment for new subway cars in New York City, were displayed.

## Dayton Dealer Will Use Astrologer to Pull Floor Traffic

DAYTON—Opening this week for a two weeks' engagement at Wurlitzer's Dayton store, Madame Alice Richey, astrologer, will conduct daily readings of the zodiac in a new and novel sales promotion for Crosley radios and electric refrigerators. Following her engagement at Dayton she will exhibit in other Wurlitzer stores.

Mme. Richey predicted the game in which the Tigers would win the World Series, the round in which Louis would defeat Baer, the two recent Florida hurricanes, and other events. Mme. Richey & Co., have recently returned from a one-year tour of the Orient and Australia, attracting between 100,000 and 125,000 spectators during their performances. Mme. Richey has been an astrologer for 19 years.

In addition to the demonstration of astrology by Mme. Richey, the new 1936 Crosley radios are also demonstrated with their optional metal or glass tubes, five tuning bands, shadow tuning, three-gang tuning condensers, triple-tuned I.F. transformers and many other features. During the performance persons may see as well as hear their own voices by means of the muto-scope oscillograph, which shows the quality of radio reception by means of an illuminated glass screen.

Scheduled also are demonstrations of Crosley electric refrigerators.

## Survey of Utilities Shows Sales Are Up

(*Concluded from Page 1, Column 5*)

utilities and independent dealers was recorded in all four divisions of the country covered by the survey. Districts were divided into (1) northeast—north of the Ohio river and east of the Mississippi; (2) southeast—south of the Ohio and east of the Mississippi; (3) central—west of the Mississippi and east of the Rockies; and (4) western—west of the Rockies.

Biggest increases, in total number of sales, were recorded by both utilities and dealers in the northeastern territories. Dealer sales showed a rise of 19,008 units, going from 116,086 in 1934 to 135,094 this year, while power company sales rose 8,377 units, from 39,606, the 1934 figure, to 47,983.

In the southeastern division, increases were nearly as large, dealer sales going from 20,340 in 1934 to 38,739 this year, a gain of 18,399, and power company sales from 13,136 to 19,587, a gain of 6,451.

The central states division registered the largest proportionate gain, dealer sales rising 14,062 units, from 59,439 in 1934 to 73,501 this year. Sales by power companies went from 9,540, the 1934 total, to 13,879 to mark up a gain of 4,339.

Western dealer sales rose by 12,645 units, from 38,437 in 1934 to 51,082 this year. Power company sales were likewise on the increase, registering a gain of 1,039 units, with 8,263 sales reported for this year as compared with 7,224 for the same months of last year.

## Thompson & Holmes Moves To New Quarters

SAN FRANCISCO—Thompson & Holmes, Ltd., distributor for refrigerators and other household appliances, recently moved into new and larger quarters at 2701 16th St. here.

Floor space in the new building covers 48,000 sq. ft. Both business offices and warehouse facilities will be located in this building. Merchandising displays featuring products handled by the concern are on the second floor of the building.

Officials of Thompson & Holmes, Ltd., are: J. W. Holmes, president; C. Sharrah, vice president and general manager; Robert E. Crane, secretary; and M. M. Sharrah, treasurer.

This concern is distributor for northern California, southern Oregon, and western Nevada of Electrolux refrigerators, Zenith radios, ABC washers and ironers, Royal vacuum cleaners, Lonergan oil burning space and water heaters, the Royal Culinaire, and Ken-rad radio tubes.

## The 'Open House' Entertainment Committee—In Action

Four members of the entertainment committee discuss plans for the "open house" Wednesday at the home of Electric Refrigeration News, at which refrigeration parts jobbers and manufacturers' agents from all over the country will be guests. Morrill Dunn, McCord Radiator & Mfg. Co.; Irving Knudson, Detroit Lubricator Co.; F. M. Cockrell, publisher of the News; Staff Writer Ted Quinn; and J. D. Colyer, Wolverine Tube Co.

## Georgia Power Contest Offers Prizes to Towns

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Co. These towns have been divided into four groups to equalize competition between large towns and small towns.

Group "A" is composed of towns having more than 400 residential customers. Prizes in this group are as follows: first, $1,000; second, $750; third, $500. Group "B" is composed of those towns between 200 and 400 customers and prizes for this group are the same as in Group "A."

Group "C" includes towns of from 100 to 200 residential customers and prizes are as follows: first, $750; second, $500; third, $400; fourth, $300; fifth, $200; and sixth, $100. Group "D" provides for competition in towns of from 25 to 100 residential customers and prizes range as in Group "D."

## 'Clearance Sales' Move Stock of Dallas Dealer

(*Concluded from Page 1, Column 2*)

found for specific models—it eliminates a lot of "shooting in the dark" for buyers.

During sales periods, the company's men are required to call on 10 prospects and three users every day. So, in most cases, prospects are plentiful.

Bonuses for selling ear-marked models range from $5 upward—depending on the age of the unit, its size, and how high it ranks on the list of "clearance" items.

Does the plan work? Well, since the two stores have been in business, they've put upward of 14,000 refrigerators in Dallas homes—and surplus stock is never a loss item.

## G-E Employees Attend Distributor's Meeting

CHICAGO—To bring employees of the various department of General Electric Co. and associated companies up to date on the electric home appliances which the company manufactures, a meeting of 3,500 employees in this territory was held at Medinah Temple here recently.

All of the G-E home appliances were on display and were demonstrated, including the electric refrigerator, range, dishwasher, garbage disposal unit, radio, lamps, iron, ironer, clothes washer, sweeper, hot water heater, oil furnace, air conditioning equipment, clothes dryer, clocks, toasters, coffee makers, waffle irons, fans, heaters, and other appliances.

The meeting was sponsored by R. Cooper, Jr., head of the Chicago distributorship. Sam Nides, Cooper sales promotion manager, acted as chairman of the gathering, while T. K. Quinn, New York, company vice president, made the principal talk.

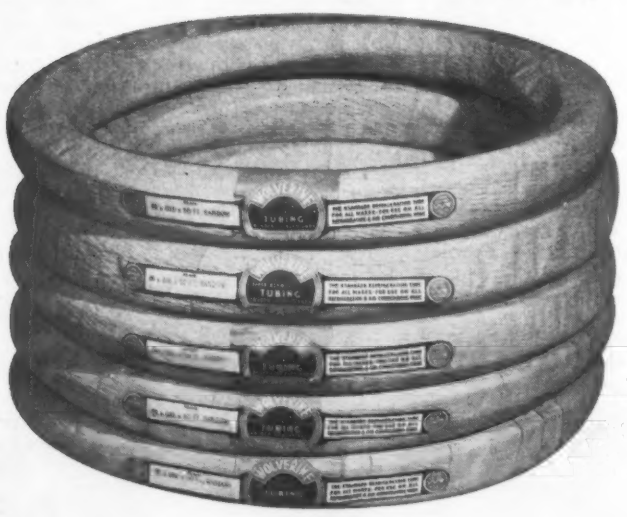
Prominent company officials attending included P. B. Zimmerman, Cleveland, manager of the specialty appliance department; Charles Wilson, Bridgeport, company vice president; J. R. Poteat, manager of the company's range division, Cleveland; and W. D. McKelvey, western manager of the central station division, Chicago.

Door prizes, consisting of the various home appliances, were given away. The motion picture, "Three Women," which promotes the use of G-E home appliances, was shown.

It is likely that similar meetings of G. E. employees will be held in the leading cities of the country, following the success of the Chicago meeting.


YOUR JOBBER

Has a Large Stock of Wolverine Tubing



You are not compelled to wait for shipments of copper refrigeration tubing from the mill. You can always find Wolverine Dehydrated Tubing and Deoxidized Water Tubing, Types K, L and M, of the proper size and specifications in your immediate locality. When you need tubing, call your local jobber for quick delivery and intelligent service.

You may now purchase Wolverine Dehydrated Refrigeration Tubing in coils, wrapped in heavy crepe paper which protects the tubing against atmospheric contact and dirt.

Each package carries complete information size, length, gage and finish (plain or tin plated). These coils make a very convenient package for the service man's kit and the tubing is kept perfectly clean until it is ready for installation.

Use your local refrigeration jobber and Wolverine Refrigeration Tubing. Both will give you the most satisfactory service you can get.

WOLVERINE TUBE CO.

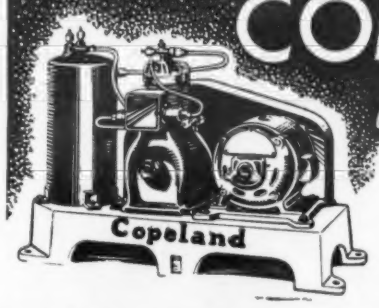
SEAMLESS COPPER BRASS & ALUMINUM

1411 Central Ave. Detroit, Mich.



Enjoying a BIG YEAR Now ... a BIGGER YEAR Coming!

COPELAND COMMERCIAL Refrigeration




COPELAND distributors and dealers are more than pleased over the business done this year. Sales have been plentiful and profitable. Many newcomers have become enthusiastic boosters for Copeland performance and the absence of unnecessary service calls. These distributors have found out for themselves that Copeland is not only remarkably easy to sell against competition, but that Copeland is also built to give the customer a break.

In considering a desirable commercial refrigeration franchise, remember that Copeland offers you: (1) Long experience; (2) Superior design and engineering; (3) Every modern manufacturing facility; (4) Stability; (5) Large resources.

The time to plan for next year - - - a Copeland year - - - is now. Write.

COPELAND REFRIGERATION CORPORATION

Manufacturers of a complete line of Household and Commercial Refrigeration

Holden Ave. at Lincoln . . . DETROIT, MICH.

Copeland DEPENDABLE Electric REFRIGERATION

# Woman Advertising Manager Puts Appeal Into 'Economy' Copy by Telling What Clothes the Saving Will Buy

DENVER—Margaret Day, advertising manager of the Joslin Dry Goods Co. here, became convinced that inasmuch as women do most of the buying, refrigerator advertising should have woman appeal, and *not* a mechanical slant directed toward men.

Consequently, she cut her refrigerator advertising budget, and launched a campaign with real woman appeal—a campaign that didn't talk in terms of mechanism, but in the easily understandable terms of cash, of money saved.

To make the copy readable and interesting, she introduced dialog, human interest. Instantly, she had Denver women reading, calculating, coming to Joslin's.

"Husband versus Wife," stated Miss Day, "is always watched and read with interest. Let the wife win, and a sale is almost made."

Thus in one of the series of advertisements Mr. and Mrs. Jones were portrayed discussing the price of ice, and cost of food waste, and groceries in general. Jones does the figuring, while Mrs. Jones does the "visioning." He sees where they can have a new refrigerator paid for in three years and $244.80 in the bank.

"No, not in the bank," says the little woman with a far-away look in her eyes. "On my back. We'll go down to Joslin's today and get the Frigidaire—then we'll look at the fur coats . . ."

To make this advertisement seem more authentic, a follow-up in the form of a testimonial is used. A short quoted letter is run with a cut of a woman opening her new box. Her saving is shown.

Says she: "My Westinghouse buys me a new dress every month."

"Humanize your time payment plan," advises Miss Day. "Make the thing real by weaving it into episodes in the daily lives of your patrons. What woman and man don't discuss current household bills periodically? Their one object is to cut them. By personifying the advertisements, these people can be shown how to cut their expenses to the dealer's profit.

"Every woman loves nice clothes. Talk clothing and she'll sit up and look twice. Infer that you hold the key to a new dress or new coat from her household budget, and her attention is held. The only thing left then is to get her to come in to ask about the plan."

The following is the copy used in one of the "testimonial" type of advertisements:

"I actually save enough . . . thanks to my new electric refrigerator, to buy a pretty new dress every month," one customer tells us. "When I was buying ice, my ice bill never ran less than $4 a month and usually more. At least $2 worth of food spoiled and had to be thrown out.

"Last month I watched for sales, and bought all my week's groceries at savings of about $1.25 a week, or $5 a month.

"My electric light bill has never run over $1 a month more and sometimes it's less. So you see, I can conservatively figure my savings at $10 a month!"

# Westinghouse Star Dealers Tell How They Sell Refrigeration in Winter

MANSFIELD—Electric refrigerators can be sold in the fall and winter, as well as in spring and summer—if you change your selling technique to suit the season.

This is the opinion of R. C. Bragg, Vallejo, Calif.; Herb Ratnor, Greensburg, Pa.; Claxton White, Pittsburg, Calif.; and Charles Foss, Lead, S. D., four "Quota Busters" who get plenty of year-around business with the Westinghouse line.

How do they do it? Here's Mr. Ratnor:

"Instead of letting up on refrigerator business during the fall and winter months, we go after it all the harder.

"We work on the husbands in Greensburg, trying to sell the idea of buying a refrigerator for the wife for a Christmas present. We start this campaign early in September, persuading them to make the down payment early, and begin payments so that by Christmas they will have the refrigerator partly paid for."

Mr. Bragg saves his most difficult prospects until fall.

"In the spring and summer months I naturally run onto lots of prospects who need considerable working on," he says. "They want electric refrigerators all right, but they want to discuss every little detail, think about it, sleep on the idea for some time.

"When I come across this kind of prospect during the spring and summer, when business is brisk, I don't put on much pressure. I call on them every few weeks, to let them know I'm on the job, and when the summer rush begins to slacken, I give them all the detail and information they crave.

"Our climate here is such that 'natural refrigeration' doesn't raise much of a problem. In the fall, I begin calling on these prospects—usually in the evenings, when the whole family is home. After two or three such calls these people usually sign up. This method of fall and winter selling has netted me quite a bit of business during the last two years."

Mr. White, another Californian, makes most of his fall and winter sales by tying in refrigerators with other household appliances.

Says he: "We suggest to the prospect for other appliances that they combine a Westinghouse refrigerator with the purchase. For instance, we point out that by combining a refrigerator with the radio, they can get a lower carrying charge (the combination contract is figured at the rate of the refrigerator), and that it may be carried out over a much longer period than if only the refrigerator were bought.

"This gives us a chance to go into the theory of saving, and we state that through purchasing a refrigerator they will actually save enough to pay the cost of the other article they intend buying.

"When we're confronted with the argument 'we'll wait until next summer,' we emphasize that if refrigeration were simply something to keep drinks cool in summer, it would not justify the cost. And then we give them a strong argument for the Westinghouse as a money saver."

If every salesman who sells merchandise other than refrigerators will start a "suggesting" campaign, he'll turn lots of $59.50 sales into $250 ones, Mr. White declares.

Mr. Foss does most of his fall and winter work with users. He makes a systematic campaign of calling on them, to sell them larger size units.

"I sell my users in the fall and winter," he says. "Many of them refused to listen to reason when they originally bought, and, as a result, have units too small for their needs. Others are now more prosperous and are in the market for more pretentious models.

"And so I make a systematic callback campaign during the fall and winter months, with the idea of selling larger and newer refrigerators.

"The customer makes small payments during the winter season, increasing the payments in the spring. This appeals to prospects because, in most cases, their refrigerators are practically paid for before the summer, when they use them most."

# Special Promotion Brings 5,000 Women to 3-Day School Featuring Electric Cookery

URBANA, Ill.—It may have been advance publicity or it may have been just growing interest in electric cookery that caused 5,000 women to attend the three-day cooking school conducted by the Illinois Power & Light Co. here recently.

At any rate, a bridge luncheon at the Champaign Country Club in honor of Miss Edwina Nolan (who conducted the school), was one of the promotional activities which publicized the school in advance. Although the luncheon was a non-commercial affair, three ranges were sold there.

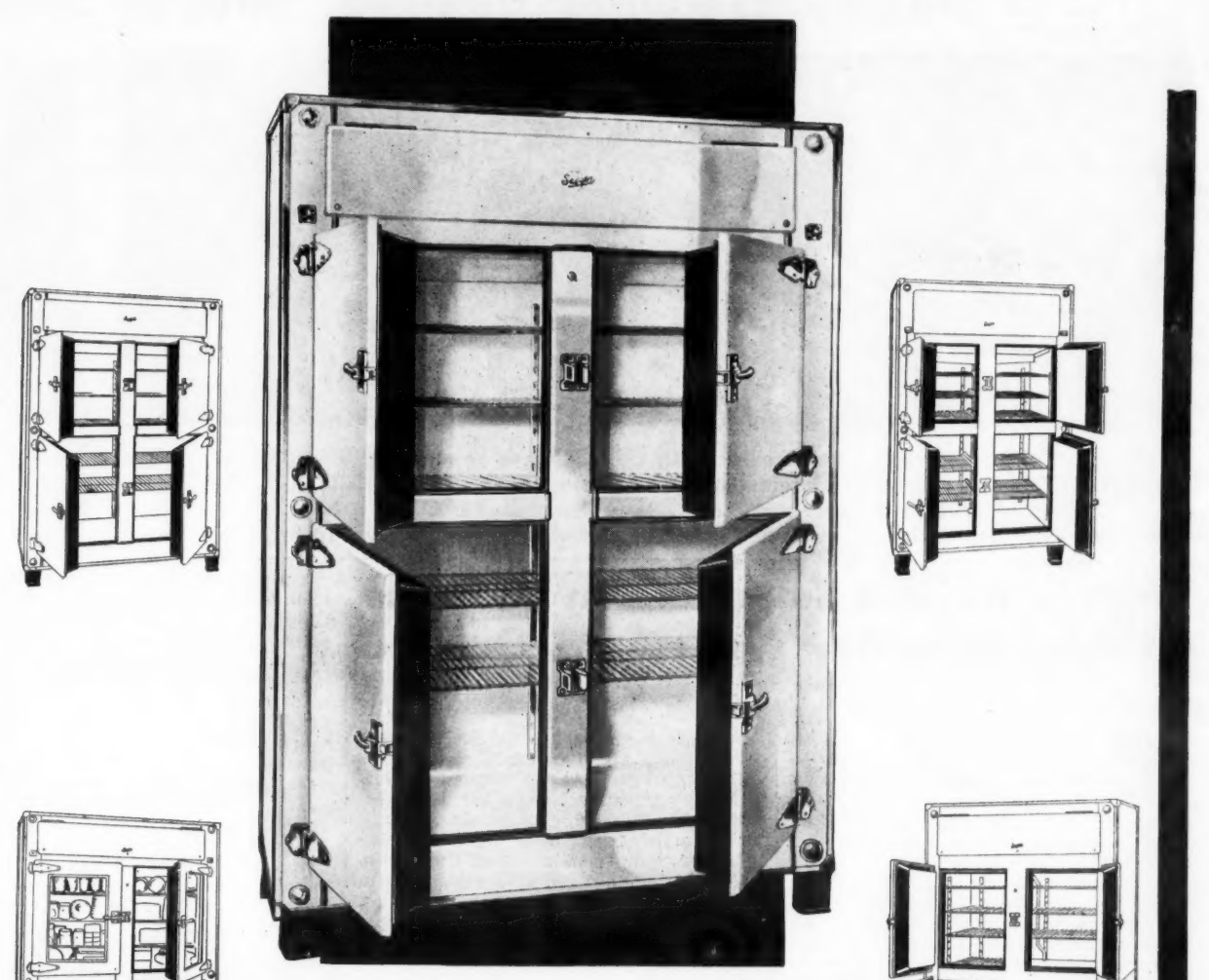
Five days before the school, invitations were issued to users of electric ranges to attend a special meeting. Of the 200 invitations issued, 125 attended the meeting.

Special articles on electric cookery were used in advance of the school by local newspapers, while an outdoor poster advertised the school. Special advertisements were run in the newspapers, and a trailer was used in the motion picture theater calling attention to the cooking school program.

Miss Nolan, General Electric home service director, was assisted in conducting the school by Mrs. Adelaide Fellows, R. Cooper, Jr., Inc., Chicago G-E distributor, and Miss Mary Allen, Illinois Power & Light Co.

Door prizes were given each day, and prizes of $10 and $5 were given to church organizations bringing in the largest number of women to the sessions. Salesmen also contacted prospects and users, urging them to attend. Trucks of the power company carried posters advertising the school.

As a feature of the school, the motion picture "Three Women," a picture produced by General Electric Co. to promote cookery, was shown.

COMMERCIAL CABINETS

By

Seeger

Saint Paul

With a background of over 30 years service to the world's most discriminating users of Refrigeration, Commercial Cabinets by Seeger are the accepted Standard of the Industry. They are built with the knowledge of the requirements and specifications of successful merchants in Grocery Store and Meat Market trades.

Commercial Cabinets by Seeger have been consistently used in the finest Hospitals, Hotels, Restaurants, Clubs and Stores where the best food is an essential.

A large and varied line of Commercial Cabinets by Seeger is offered to fill the requirements of the ordinary installation. For unusual requirements, the Seeger "Made to Order" Department may be called on for plans and specifications.

Commercial Cabinets by Seeger are sold through Dealers and Distributors of Electrical Refrigeration.

*For complete details write*

SEEGER REFRIGERATOR COMPANY
SAINT PAUL, MINNESOTA
*New York Boston Chicago*
*Los Angeles San Francisco*

Special Representatives:
Meyer Smith Co., Buffalo, N. Y.
Seeger-Philadelphia, Inc., Philadelphia, Pa.

Seeger Commercial Cabinets and Display Cases Are Advertised to 148,908 Merchants

# Industry Executives Compare Notes at Annual Nema Meeting in Chicago

Lunch time during the recent Nema meeting in Chicago gave some of the industry's leading executives a fine chance to compare notes. (1) J. A. Harlan of Kelvinator, Frank Pierce of Frigidaire, and John Knapp of Norge see interesting sales possibilities ahead in 1936. (2) Two twosomes exchange experiences—W. Paul Jones of Fairbanks-Morse, Charles Gibson of Gibson, C. R. D'Olive of Stewart-Warner, and Louis Ruthenburg of Servel. (3) John Ditzell of Stewart-Warner is so optimistic over what's ahead that W. A. Carson of Sunbeam is inclined to doubt him. (4) Mr. Harlan (center) explains commercial refrigeration standards progress to Mr. Knapp, Mr. Pierce, Lewis Crosley of Crosley, and R. C. Cosgrove of Westinghouse.

## Ways in Which a Salesman Can Make Use Of Advertising Are Analyzed & Outlined

By T. T. Quinn

THE title—"What a Salesman Should Know about Advertising"—of this Dartnell manual, written by J. C. Aspley, may be a bit misleading—but it isn't a volume intended to teach the salesman how to run the advertising department.

Good salesmen are far too busy to worry about matters that concern the advertising end of the business, as far as preparation of copy is concerned. What they want to know is how to take advertising and make more money with it, after it has been prepared.

That's what this idea-filled non-technical volume attempts to help them to do.

Unless a salesman appreciates how directly advertising is linked up to his efforts and his earnings, says the author, he cannot grasp its full significance, and consequently cannot hope to gain the most profit from it. For the real purpose of advertising is not so much to close sales as it is to reduce selling resistance.

### Time to Devote to Selling

Advertising lifts the burden of doing educational work from the salesman's shoulders, giving him more time to devote to actual selling work. With advertising the salesman is in the same position as the man who has junior salesmen, paid by the company, but whose sales are credited to him.

But advertising can succeed only when salesmen harness their own efforts to it. In opening up new accounts, in keeping old ones up to and above level, the advertising which backs up the salesmen has a large and important part. Most men realize this, but often take it for granted, and underrate its influence on incomes and sales totals.

This tendency, says Mr. Aspley, must be guarded against. Like a salesman's best argument, the advertising department should be worked overtime. Only then can its worth be fully appreciated—and cashed in on.

Many salesmen have a distorted idea of advertising principles. Some of them are convinced that the cost of advertising comes out of their own salaries. This opposition, says Mr. Aspley, is fundamentally the same as the opposition of the unthinking mechanic to labor-saving machinery. Advertised products sell easier, and in greater volume. Salaries must come out of profits—and profits must come out of volume. If volume isn't there, profits can't be.

The advertising back of a salesman takes him out of the "fly by night" class, gives him dignity in the eyes of the man he is selling. Above all, it enables him to sell a higher-grade article for less money.

The argument that the consumer pays for advertising is erroneous. A few isolated concerns may take advantage of advertising-made demand to boost prices, but such cases are exceptional, the author contends. When the cost of advertising is distributed over the entire output, it is too trifling to warrant serious consideration as a factor in the resale price. Even among the largest advertisers, the average cost seldom exceeds 5 per cent of sales.

### Paid by Non-Advertisers

But, if neither the salesman, the advertiser, the manufacturer, nor the dealer pay for advertising—who does? The answer, Mr. Aspley says, is: The cost of the advertising is paid for by the concern that does *not* advertise. Only when advertising fails is its cost paid for by the advertiser.

Salesmen believe in advertising because advertising is selling. But there's a big difference between having this belief and in knowing how to apply it, with more profit for yourself.

The South Bend Watch Co. men believed in advertising, but had to be shown how to use it to make more sales. They had to be shown how to get across to the dealer the story of how advertising was going to create a demand for more watches—a demand that the dealer would have to stock more watches to meet. The salesmen sold the dealer "new business," and profited as a result.

There are many ways in which advertising can be used to get under the guard of the skeptical buyer. Big point to remember is this: advertising is the best aid a salesman could ask for to help him in lining up new business. And he's only cheating himself if he doesn't make a practice of studying his company's advertising, and fitting it into his sales talk.

Salesmen who tell you they haven't time to talk advertising to the dealer are riding for a fall, Mr. Aspley says. For these men, it's only a question of time until somebody else will have their territory, making more sales and more money than they ever dreamed was in it. For the salesmen who are getting the prize territories are the ones who are shrewd enough to put advertising to work for them.

### Direct Mail Work

Another way in which salesmen can put the company to work for them profitably is through the direct-mail list. This, says the author, is a sure and effective means of keeping new business coming along. Records of the Addressograph Co. show that 80 per cent of the equipment sold is to concerns who have been consistently worked by mail, as well as by salesmen.

Whatever you are selling, whoever you are selling to—if you have an advertising department that is ready and willing to work for you, use it, counsels Mr. Aspley. No matter how much of a "hot shot" you may be, the direct mail pieces which the office sends out will make your work easier and your earnings larger.

One advantage of a letter, says Prof. George B. Hotchkiss of New York University, is that it is less likely to be interrupted. At any rate, the reader cannot interrupt it himself by asking questions or raising objections. Of course, you cannot compel a man to read your letter—he may stop at any time. But, if he does read it, you can compel him to follow your line of thought.

### Unwise Over-Selling

Much of the so-called indifference toward advertising is the aftermath of unwise over-selling on the part of unscrupulous salesmen who, in the old days, talked loudly of gigantic advertising campaigns—which never matured. The wily dealer, once fooled, pays little heed to the "demand" which, the salesman assures him, will result from the advertising of a certain product.

"That's all very well," he may say. "Go ahead and advertise—if it creates the demand, then I'll stock up on the goods."

Best way to avoid this pitfall, says Mr. Aspley, is to change approaches. Instead of selling on the strength of future demand, assume the demand will come—and stress to the dealer the advantage of handling something his customers will accept without question. This is known as the "customer-acceptance" principle of advertising. If this fails, the following argument is often effective:

Did the dealer wait until the citizens demanded he start a place of business before he opened his doors? No, indeed. He opened with the belief that he would have saleable goods when they did call. Adding a new brand now and then, to keep pace with his customers' changing wants, is the same thing, in principle, as opening the store at the start without a call.

Waiting for a demand before making a purchase is just like waiting for Old Man Winter to "make a call" before stocking up the coal bin.

Advertising statisticians have estimated that the cost of an average inquiry is about $10. Some run as high as $50 or $75, in marketing some kinds of special machinery. Even mail order inquiries cost in the neighborhood of $2 to $3, if they're for things other than free books.

With costs this high, it is easy to see the importance of squeezing every ounce of business out of each lead. Big advertising campaigns have fallen through, simply because salesmen didn't follow leads thoroughly, and try hard to turn them into dollars.

One of the major causes of failure, says Mr. Aspley, is the natural inclination most of us have of sizing up inquiries on the basis of their face value. He tells of one large account which was lost by a big agency because an inquiry concerning a comparatively small-time campaign was tossed around from one person to another, with no thought as to its potential value. It now pays the man who took it seriously more than $5,000 a year in commissions alone.

"Unless you are positive that a lead is no good, by all means run it down," counsels the author. Easily gulled salesmen lose plenty of business by not following this practice.

The "dead" prospect file is one of the biggest profit suckers that selling has ever known, if you ask Mr. Aspley. It is a monument, built with hard-earned dollars, to the inefficiency of present-day salesmanship. Every day, salesmen mark half-worked leads "no good," and send them back to the office to be placed in the dead file. But there are plenty of sales there, if you take the trouble to hunt them out.

The salesman who gets the most out of his territory is the one who is wise enough to leave no stone unturned when it comes to getting the business. He will be the man who is continually on the lookout for signs, and who knows the great value of intelligent, sustained effort in sales.

### Hook Up with Dealer's Store

If you sell to the dealer, the good you get out of the advertising your house is doing depends on the generalship you use in hooking it up to the dealer's store. And if you don't do this effectively, Mr. Aspley says, you're in about the same spot as the ballplayer who belts one over the bleachers, and dashes for the clubhouse instead of around the bases.

To make money for salesmen in this field, it is necessary to see that the company's advertising is linked up with the store in which the product is sold. Every customer in the territory may know about the product, but that won't put any orders in his book, if the customers don't know where they can buy it locally.

One of the best means of calling attention to the product is, of course, by window displays. In the same class are counter displays. "Suggestive selling" is a third method—this by lining associated items in close relation to one another, so that the sales of one will influence those of the other.

An important means is by dealer advertising of your product: newspaper, street car, billboard, circular, and the like. Get the dealer to set aside a certain per cent of his annual sales for the creation of new business. Sell him this plan, and he will sell more goods. That's where the salesman's added profits come nito the picture.

### Local Tie-In Effective

Getting the local dealer to connect local advertising with a national campaign will pay the salesman for the time and effort it takes to sell the idea.

One thing to look out for, says the author, is the danger of "going stale" in talking about advertising. Dressing up old arguments in new clothes will do away with this stumbling block. Presenting the company's advertising tie-up plans in an off-hand way will seldom bring results. Taking the company's present campaign, and bringing it right down to the dealer's size, telling him what will be done to help him sell in his own territory—that spell Sales and Profits for the salesman, in capital letters.

Cooperation with the advertising department, in plans, ideas, and suggestions, is another big dividend-paying practice for salesmen, Mr. Aspley writes.

The advertising department of an organization has been likened to a clearing house for all sorts of information of value to a salesman. Combined experience is always a better sales-getter than the experience of one individual. Exchanging ideas, through the advertising department, helps the whole organization to become more effective, by increasing the efficiency of the individual members.

Read the advertising proofs sent to you, advises Mr. Aspley. Comment on them, tell how you think they might be improved. Think of advertising, not as something which interests you indirectly, but as a direct influence on the profits you will make.

If you can give the advertising department one idea which will increase your company's business, it's almost a sure thing that your individual sales will be increased by a proportionate amount. Whatever you do to increase the returns from advertising, you can be sure will be reflected in increased sales for you.

First two divisions of the manual are devoted to the economics of advertising, and how to capitalize on it by making more sales, and more profits. In the book's final division, Mr. Aspley takes up a highly important angle of the question: personal advertising.

### Personal Advertisements

Everything we say or do in life is a personal advertisement. One of the most effective forms of personal advertising is appearance. Starting out on a job, most of us are very careful of this matter. But as we grow old in the harness, we are apt to gloss over this thing of always looking our best. The important thing, is to be able to "get next" to the person we are selling.

That's true. You needn't be well-groomed to be a good salesman—but a good salesman will be a better salesman if he is well-groomed. Grooming carries all the way down the line—to the very bottom of our living habits.

Eating, reading, companions, punctuality, speech—all of these are personal advertisements. And all of us, salesmen or not, are judged by them.

One thing which it will pay the salesman to look out for, in his sales presentation, is the use of superlatives. It is, on the whole, better to understate than to exaggerate.

When you describe a thing with such words as "unsurpassed," "best in the world," "magnificent," "nothing can equal it," "without a peer," etc., you unconsciously give the buyer the idea that you are trying to exaggerate. Even if your product is the best on earth, he won't believe it just because you say so. He discounts your statement, and, as a result, your whole sales talk.

On the other hand, if you state your claims frankly, the buyer is apt to think you've got more on the ball than you admit having. Expert letter-writers say 50 per cent of a winning letter's effectiveness is giving it a tone of sincerity. The same thing holds true of a sales talk.

If you can't answer an objection, admit it. Don't try to bluff around the question. When you are frank, you engender confidence—and that makes sales.

Every call should be an advertisement of you and your company. And every call should be a sale. If you can't sell goods, sell good-will.

One of the big corporations employing several hundred salesmen recently issued a general order suggesting several methods by which their salesmen could promote good-will. Mr. Aspley presents them. They are:

"1. Sell the house with every bill of goods. Prove that it's a good firm to tie to.

"2. Be conservative in your statements.

"3. Make no promises you cannot fulfill. It is hard to do, but it pays.

"4. Avoid using the house for the butt. In your customer's eyes, you and your house are one.

"5. Make every order a sale. Be sure the customer knows what he's getting and what it will do. The returned-goods evil is the greatest good-will destroyer in existence."

The best advertisement of all, of course, is a satisfied customer's recommendation. Satisfied customers are more necessary than goods, money, or men, if a business is to endure. Everything else is but a means to that end.

*Have you received your copy of "Ansul Refrigerants"?*

ANSUL CHEMICAL COMPANY
MARINETTE » » » » » WISCONSIN

SALES PROMOTION IDEAS are the seed of successful merchandising. Without them no harvest of sales records is possible. From them grow trade-name reputations and public recognition for outstanding products. Well-chosen promotion ideas like well-chosen seed, yield the best return.

A good sales promotion idea, to be effective must be transmitted to the right people at the right time. Scattering seed to the wind, or on barren soil, is wasteful. Likewise, careful selection of the medium and the market are essential to successful advertising.

The manufacturer who desires to cultivate the rich field now offered by electric refrigeration, and who aims to secure a share of the new field of air-conditioning, finds his problem greatly simplified by the unique service of Electric Refrigeration News.

In this one trade paper you have a ready-to-use medium for the efficient distribution of a timely message to the companies and the men who count. Issued every week, read and believed by the leaders in every branch of the industry, respected because of its straightforward editorial policy, it provides the reader interest necessary to insure attention.

If you have a good product and a sound merchandising plan, Electric Refrigeration News will carry your proposition to the most fertile areas for refrigeration and air-conditioning around the world.

ELECTRIC REFRIGERATION NEWS, 5229 Cass Ave., Detroit, Mich.

# Jones Says Codes Won't Work And Asks Return to Basic Economic Principles

By Frank C. Jones, President,
National Electrical Manufacturers Association (Nema)*

I WOULD like to mention a few problems I think are confronting us, and which we will have to try to solve during the next 12 months. Some of these are problems we can solve as an industry, and take our stand on as an industry; others are problems upon which we will probably have to make up our minds as individuals, and take action as individuals; but all of them, I feel, will effect us not alone as individuals, but also will effect not only our industry, but all industry, and even the eventual welfare of our country and our American standard of living.

The first of these is the N.R.A.

I presume most of us thought the N.R.A. was dead and buried when the Supreme Court rendered its momentous decision last May. However, the National Recovery Administration, which housed that famous bird, is apparently to be repaired and repainted, and readied for some new occupant.

*Address before the Policies Division of Nema at the annual meeting Oct. 9 in Chicago.

### Senate Analyzes Material

On Aug. 24, just before Congress adjourned, President Roosevelt wrote a letter to Senator Harrison, chairman of the finance committee of the Senate, placing certain information before that committee, claiming serious impairment of the standards established under codes by a minority in industry. He requested that the committee analyze the material sent with his letter, and to be sent later by the N.R.A. staff, in order to obtain a thorough understanding of the subject.

I will quote from President Roosevelt's letter:

"With this done, your committee could meet in the fall, for hearings and the formulation of proposed legislation for preserving permanently to the nation such social and economic advantages as were gained through previous emergency enactments. This would enable you to offer at the opening of the coming Session, a well considered program for congressional action."

A similar letter was sent to Robert L. Doughton, chairman of the committee on ways and means of the House of Representatives.

### Is Permanent Code Wanted?

Do we want a permanent code and a permanent N.R.A.?

As you gentlemen know, I had an unusual opportunity to study the workings of the Electrical Manufacturing Industry code.

I was fortunate in being a member of the code committee which formulated and negotiated the code with the N.R.A., and let me say right here, in defense of this much abused committee, that we were not the sole authors of the code.

Many things went into the code because the N.R.A. said they had to go in, and many things were left out because the N.R.A., or some one of the many advisory boards, said they could not go in. Despite all that, we had as good a code and as flexible a code as any I know of, and a good deal more workable than many others; but, we all know, it was far from perfect.

Also, I was a member, and for a time, chairman of the code advisory committee.

In addition, I was chairman of the supervisory agency of the wire and cable classification, and heard all the multitudinous difficulties of code operation arising within its 19 sections, groups, and sub-groups.

### Code Violations

In short, I don't believe there was a type of complaint, or type of violation that did not come to my attention some time or other during the operations of the E.M.I. code.

I will admit that many of us gained, financially, during the time of code operation. I will even admit that my own company went from the red to slightly in the black during that period.

But I'm damned if I know whether it was due to the code or to the natural slight increase in business due to the first stirrings of economic recovery. I do know, however, that some of our so-called pre-code chiselers, waxed fat, and increased their normal percentage of the total business, by chiseling under the umbrella that the code obeying members of my section of the industry were forced to hold over them.

### New Chiseling Developed

I also know that a new technique of chiseling was developed by many, and that some unsound practices were established that it will probably take us years to eradicate.

For the sake of argument, I am willing to admit that codes and the N.R.A. were good things as emergency measures. But I don't think we want them as part of our permanent economic structure. I am convinced that they will not work.

I doubt the ability of any group of men to write a workable code for even the most simple of industries; and for one as vast and complex as the electrical manufacturing industry, I feel sure that it cannot be done.

Prices and wages have always been governed by economic law, and, I think, always will be so governed. We may not like the law of supply and demand, but I know that neither the New Deal nor Congress can change it; and I am convinced that any legislation attempting to permanently fix prices or wages, will only retard prosperity.

Our country was set up as a free country, with a government by the people, for the people. We have, for generations, been accustomed to freedom of action, and I doubt the ability of our people to succeed and progress under any coercive bureaucracy such as N.R.A. was developing into.

### Bureaucracy Needed

To make codes 100 per cent successful, you must have a coercive bureaucracy to administer them; and to 100 per cent administer them, as permanent laws, you would have to have a far larger bureaucracy than the old N.R.A. ever dreamed of; and to get 100 per cent compliance, you would need a police force that could dwarf our present army and navy.

What we probably need, is some modifications of the Clayton Act and the Sherman Anti-Trust Law, with possibly some strengthening of the Federal Trade Commission Act; but, in my humble opinion, we do not want any part of a new permanent N.R.A. with new permanent codes.

That, however, is something you gentlemen will have to make up your minds about in the next few months; and will have to put your shoulders to the wheel to make your opinions and wishes felt.

### Questions Philosophy

Another problem before us, is very much tied in with the first. Perhaps I am too conservative, or have gotten too old and fixed in my mental processes to be able to understand the so-called new economics and new physics. At any rate, it is still beyond me how you can spend your way to prosperity from depression; or raise yourself by your boot straps. The N.R.A. philosophy is certainly the latter, and the C.W.A., P.W.A., and W.P.A. are certainly examples of the former.

There have been so many wild theories expounded and ballyhooed in the last few years; so many isms and nostrums introduced and put over as new discoveries and new truths, that I think it is about time we returned to the hardheaded common sense thinking of our ancestors, and realized that two plus two equals four, and when you subtract five from four, you have minus one and not plus nine, or any other plus that may be the most convenient at the moment.

Even if we, ourselves, get our thinking back again to simple fundamentals, get our economic ideas straightened out and back to the practical basis we were taught in our youth, it will not do us, or our country, very much good, if we do nothing further about it.

What we must do is try to educate our employees in the same simple fundamentals, and get them thinking along the same commonsense lines that we must think.

If we are honest with ourselves, I think most of us will have to admit that we have listened to the honeyed promise, been somewhat lulled to sleep by the hope of a miracle, and have been lured to forgetfulness of past experience by the illusions offered of finding an easy path, a short cut, to recovery. If we, who are supposed to be leaders, are so fooled by the sweet music of the Great Promisers, we cannot blame those we lead from listening to the same tune.

### Faith in Workers

I have great faith in the intelligence and hard common sense of the workers in this country, and I am convinced that, if we will but do our part, and quickly give them the opportunity to learn the ABC's of practical economics, that they will insist, with us, that this country return to the necessary first principles for rapid recovery.

There is a third problem facing all of us next year, and for some years to come—taxation.

It is just as foolish for us to say that taxes must not be increased, as it would be for us to say that we will not pay any taxes. Taxes must be increased to the tune of over a billion dollars a year, if we are ever going to have any chance to balance our Federal budget.

The question is how these taxes should be raised.

The recent "Soak-The-Rich" tax bill, with its pitifully small estimated returns, shows the impossibility of raising the necessary revenue from that source, and leaves only one common sense possibility, and that is, the broadening of the tax base.

Now let me read you a statement made by Senator La Follette on Aug. 12, when he proposed in the Senate that the tax base be broadened:

"We have reached a point where the taxpayers must decide whether they are willing to pay more than at present, or have uncontrolled wild cat inflation.

### Widened Tax Structure

"Every country has been faced with this choice, and only one, thus far, has had the courage to meet the problem by widening application of its tax structure. That one is Great Britain. Wild cat inflation leads to an upside down condition, in which those least able to pay, suffer most. Therefore, I believe the taxpayers in the lower brackets should be willing to make a small contribution in extra taxes for their own protection. The money can't all be obtained from other sources."

While I do not agree with many principles of government, as advocated by Senator La Follette, and published in the press, I certainly do agree with the above statement, which is plain common sense, although I think it stops short of what is necessary.

Congress has gone as far as it can in soaking the rich; in fact, it has put an end to the accumulation of weath by the individual. It has placed great burdens of taxation on corporate investments, and if it tries to expand its taxing policies further in that direction, it will put an end to combined capital, corporate or otherwise. Then we will surely return to the "horse and buggy" days—if not even further—to those of the ox-cart.

### Lower Brackets of Taxation

The only sound solution that I can see, is broadening the tax base; and not only having those in the lower brackets pay a little more, but lowering the brackets themselves, so that more people will contribute a little something. The more people paying some direct tax, the more who will be interested in the amount of expenditures, and the sooner we will get sanity in Federal spending.

Here, again, we will have to try, not only to be leaders, but also put our shoulders to the wheel for our own good; as well as for the good of every man, woman, and child in this country.

Summing up, briefly, gentlemen, we, as a nation, must get back to first principles—must take our coats off and go back to work. We must work more and not less. We must produce more wealth so that there will be more wealth to divide. We must pay more taxes so that our budget can be balanced and our debts paid; so that more and more of our total national savings can go into productive, wealth creating, employment; and less and less into non-productive governmental expenditures.

We must realize there is no royal road to wealth, and no royal road to economic recovery and prosperity; we must climb to them by using old-fashioned common sense, rather than slip to a lower national standard of living by accepting the political panaceas now offered in place of hard work and thrift.

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10-23-35

# Columbia, S. C., Survey Gives Data on Local Market for Electric Refrigerators

COLUMBIA, S. C.—The consumer importance of the family man in the lower income classes is graphically revealed in the fourth of a series of studies, compiled for this city, and covering the use of electric refrigerators, electricity, home and automobile ownership, and other selected goods and services.

The survey was made by the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce. Previous reports in the series covered Austin, Tex., Portland, Me., and Fargo, N. D. In preparation are two more, covering Salt Lake City and Trenton, N. J.

Columbia's 1930 population was 11,184, according to census figures. For this survey, about 15 per cent of the census total was taken: 1,008 white families, and 689 negro families, a total of 1,697.

### Income Range

Incomes ranged from none at all to more than $15,000, with about 1 per cent in the $7,000 or above class, and 3 per cent in the "no income" group. It is important to know, however, that more than one-half of the families in Columbia had incomes of less than $1,000 for the year.

Sixty-three per cent of the white families and 4 per cent of negro families had incomes of $1,000 or more for the year; 48 per cent of the white families had incomes ranging between $1,000 and $3,000. Only 4 per cent of the negro families, however, were in this group. No negro families received incomes of $3,000 or over, while about 15 per cent of the city's white population reported receiving at least this amount.

### Refrigerator Figures

As far as mechanical refrigerators were concerned, the survey showed that they were owned by more than 65 per cent of those families in Columbia that have yearly incomes of $3,000 or more, and by 18.3 per cent of all families in the city.

Practically all homes with this type of equipment are occupied by white families, and more than 50 per cent are occupied by families that own these homes. Since tenants in Columbia far outnumber owner-occupant families, the difference in consumption of mechanical refrigerators between these two groups is best shown by the fact that only 12 per cent of the tenant families use this equipment, compared with about 35 per cent of the home owners.

### Installations in Lower Group

Not quite one-tenth of the total number of mechanical refrigerators used in the city are in the homes of families with incomes of less than $1,000 for the year. It is interesting to find, however, that refrigeration equipped homes are occupied by an average of nearly 36 per cent of all families within the three income classes between $1,000 and $3,000.

Highest percentage of ownership is held by the group with incomes of $7,000 or above, with all homes refrigeration equipped. Only a relatively small number of the city's homes, however, come within this income class, and so it is by no means the largest user of refrigeration equipment.

### 28.7% in $2,000-$3,000 Class

That distinction, on the basis of actual number of mechanical refrigerators in use, is held by the group of families reporting incomes between $2,000 and $3,000. This class owns 28.7 per cent of the total of refrigerators in the city. Close behind is the $3,000 to $5,000 income class, with 23.9 per cent of the city's total. Third is the $1,500 to $2,000 class, with 20.6 per cent.

The $7,000 and over class, despite its 100 per cent saturation, reported ownership of but 4.2 per cent of the refrigerators in use in the city. The same was true of the $5,000 to $7,000 class, which owned but 4.5 per cent of the city's total.

### Saturation Figures

A study of the comparative figures for the various income classes brings out saturation points in mechanical refrigeration varying from 100 per cent, for the highest income class, to 1.4 per cent, for the class with incomes between $1 and $500.

Broken down into percentages, the figures for the different income classes are as follows:

$7,000 and over: 100 per cent, or 13 out of 13 homes; $5,000 to $7,000: 63.6, or 14 out of 22; $3,000 to $5,000: 62.2, or 74 out of 119; $2,000 to $3,000: 54.9, or 89 out of 162; $1,500 to $2,000: 39, or 64 out of 164; $1,000 to $1,500: 15.7, or 28 out of 178; $500 to $1,000: 4.6, or 16 out of 349; $1 to $500: 1.4, or 9 out of 646; and "no income" class, 18.2, or 3 out of 44.

Electric refrigeration manufacturers, distributors, and dealers may gain many sales-getting tips from a careful study of the statistics for Columbia—as, indeed, they may from the figures for any city in the government's survey.

For instance, survey figures show that 66.8 per cent of Columbia's families live in homes wired for electricity. On that basis, the maximum number of families who might use electric refrigerators would be limited to an estimated total of 8,260, or 66.8 per cent of 12,361, the number of families shown in the city by the Real Property Inventory of 1934.

The three income classes between $2,000 and $7,000, comprising about 17.8 per cent of the city's family population, rank sufficiently high in percentage of families using electric refrigeration to far outnumber consumers in the highest income class, where 100 per cent saturation is reported.

As stated above, the figures indicate that 54.9 per cent of all families in the $2,000 to $3,000 class have electric refrigerators, sufficient to place this group well in the lead in point of actual number of users.

### Largest Potential Market

The largest potential market, the survey would tend to show, is in the classes with incomes between $1,500 and $5,000, for here are listed 73.2 per cent of all the electric refrigerators in the city. Interesting, also, is the fact that even the $500 to $1,000 income class has a larger share of Columbia's electric refrigerators than the highest income class. The figures here show 5.2 per cent as compared to 4.2 per cent.

Only a small percentage of families who have gas or electricity, or both, claim to have mechanical refrigera tors. Almost half of the families in the $2,000 to $3,000 income class report no use of this equipment, despite the fact that this class contains a greater number of mechanical refrigerator users than is found in any other one group.

### Owner-Occupants Lead

Another interesting fact brought out by the survey is the revelation that, as compared with tenant families, owner-occupants show a greater tendency to use electric refrigerators. Tenant families outnumber owner-occupants almost three to one, but the percentage is almost turned around when refrigeration ownership is considered, owners having 35 per cent of the units to 12 per cent for tenants.

Comparison of owner-occupant and tenants for the negro population indicate, that although 13 per cent of home-owners of that race have gas for cooking and 72.2 per cent have electricity for lighting, less than 1 per cent have mechanical refrigerators of any kind.

Close study of refrigeration ownership figures for the different income classes, together with comparative figures regarding the use of electricity for lighting, should give the distributor and dealer a general picture of the retail situation, and a hint as to where his advertising and sales efforts might bring the best results. The same holds true of automobile ownership.

### Automobile Ownership

Automobiles are owned by approximately 40 per cent of all families in Columbia, by more than 75 per cent of the white families who own their own homes, and by about 50 per cent of white tenants. Of all reporting families, only 4 per cent have more than one car.

There are distributed among the same people in this city about two and one-half times as many automobiles as electric refrigerators. Some relationship between tenancy and car ownership apparently exists, since almost 70 per cent of tenant families are without an automobile, as compared with only 35 per cent of home owners. Furthermore, more than 10 per cent of the home owners, and less than 2 per cent of the tenants, report more than one car to a family.

As might be expected, most of the families without cars are in the low-income groups. Almost 85 per cent of no-car families have yearly incomes less than $1,000.

### Users of Electricity

Electricity is used for lighting by more than 99 per cent of the white families of Columbia that own their own homes, and by slightly more than 90 per cent of the white tenants. However, the absence of electricity for lighting in nearly 28 per cent of the negro owned homes, and in over 80 per cent of the houses rented by negroes accounts for the fact that, among the city's population as a whole—all races combined—only about two-thirds (66.8 per cent) of the residents live in homes equipped with electricity.

Relation between incomes and the lack of electricity is shown by the fact that almost 99 per cent of the families without electric lighting facilities reported incomes of less than $1,000. On the other hand, all families with an income of $1,500 or more have electricity for lighting.

Although nearly 30 per cent of the families reporting incomes between $500 and $1,000 fail to have this equipment, this income class, being the largest in point of number of white families, contains the greatest number of homes wired for electricity. White families have fully 75 per cent of the wired homes in this group.

A comparison of figures for ownership of electric refrigerators, of one automobile, and the use of electricity for lighting should be valuable to the electric home appliance dealer in indicating to him where his best potential market lies. For convenience, these figures are listed in parallel columns, below:

| Income Class | Refrigerator | Automobile | Electricity |
|---|---|---|---|
| $7,000 and over | 100.0 | 61.5 | 100.0 |
| $5,000 to $7,000 | 63.6 | 59.1 | 100.0 |
| $3,000 to $5,000 | 62.2 | 72.3 | 100.0 |
| $2,000 to $3,000 | 54.9 | 71.0 | 100.0 |
| $1,500 to $2,000 | 39.0 | 73.8 | 100.0 |
| $1,000 to $1,500 | 15.7 | 55.6 | 96.1 |
| $500 to $1,000 | 4.6 | 30.4 | 71.9 |
| $1 to $500 | 1.4 | 8.0 | 32.4 |
| No income | 18.2 | 22.7 | 52.3 |

# Sales Contests & How to Run Them

### NO. 12—"BIG GAME HUNT," WITH LIONS AND TIGERS TO THE LEADERS, SKUNKS AND SNAKES TO LOW MEN

By John Kumler, Sales Contest Manager
Buckley, Dement & Co., Chicago

MelOrol Ice Cream (Borden) recently held a very successful Big Game Hunt in which awards were given for bagging elephants, lions, tigers, bears, wolves, fox, deer, rabbits, etc. The penalties were for getting skunks, snakes, dogs, and cows. For example, in your own case the sale of—

One unit could equal a rabbit or a fox, if it retailed above $200.

Two could represent a fox or a wolf; three, a wolf or a deer; four, a deer or a bear; five, a bear or a tiger; six, a tiger or a lion; seven, a lion or an elephant; and eight, an elephant.

As to penalties:

Give a skunk if the salesman makes no sales during the week.

Give a snake to the low man each week—it's his job to get rid of it.

A dog to those who fail to connect on a demonstration. Chalk up one cow to any man who fails to locate at least one new prospect each day.

A blackboard with a corral for each man is all you need, listing the animals bagged as they get them.

For trophies, you can use cups, merchandise, cash, vacations, holidays, trips, or a dinner of eight courses.

## Restaurant Window Display Tells about Air Cooling

PHILADELPHIA—Window display in the Jolly Post Restaurant informs residents of North Philadelphia that this dining spot has been equipped with a complete Servel air-conditioning system to afford clean comfort.

Equipment consists of a 3½-ton Servel air-conditioning machine unit, connected to a heavy-duty suspended-type Servel air conditioner. Installation was made by the James Spear Stove & Heating Co.


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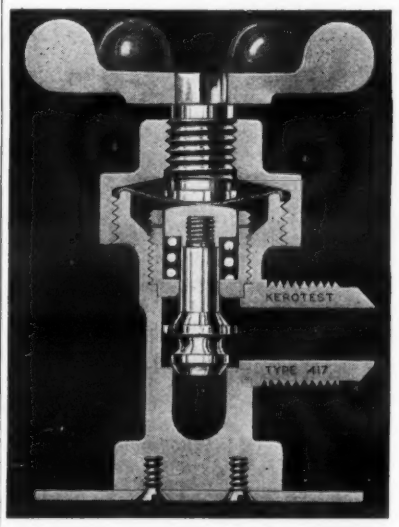

3 TESTS

This unusual valve meets the Underwriters' Laboratories pressure test of 11250 pounds in full open, half open and closed positions as well as a durability test of 50,000 cycles open and closed. Every valve is pressure-tested in gasoline before being shipped.

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Baltimore, Md...Melchior, Armstrong, Dessau Co.
Bangor, Maine.....Utilities Distributors, Inc.
Boston, Mass.....A. E. Borden Co.
Bridgeport, Conn.....Parsons Bros.
Brooklyn, N. Y.
Coleman Electrical Supply Co., Inc.
Buffalo, N. Y.....Root, Neal & Co.
Cambridge, Mass...Melchior, Armstrong, Dessau Co.
Chicago, Ill.....H. W. Blythe Co.
Chicago, Ill.....Max A. R. Matthews
Cincinnati, Ohio.....The Merkel Bros. Co.
Cincinnati, Ohio.....Williams & Co., Inc.
Cleveland, Ohio.....Williams & Co., Inc.
Columbus, Ohio.....The Justus & Parker Co.
Dallas, Texas.....The Electromotive Co.
Davenport, Iowa.....Republic Electric Co.
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San Francisco, Calif.
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Seattle, Wash.....Harrison Sales Co.
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St. Louis, Mo.....R. H. Spangler
Waterloo, Iowa.....Austin Jones

# ENGINEERING

## Thompson Warns of Dangers & Problems in Attempts to Change Refrigerants

By R. J. Thompson, Kinetic Chemicals, Inc.

THE progress in the art of refrigeration that has taken place over the past 50 years, and especially in the small systems in the past 15 to 20 years, has been most remarkable; and the future of the industry is one to inspire all connected with it. This advancement and development has called for vast expenditures of time, money, and brain power to cover the necessary research and engineering, investigation of improved production methods, while at the same time giving full consideration to the question of maintenance. Other developments necessary were more of a material nature—new refrigerants, new metals, new insulation, new finishes, new everything, including new standards to meet customer demands.

Throughout this development the principles of refrigeration have remained the same, but application or use of those principles have changed to the degree that we understand the problem today.

The goal toward which all reputable manufacturers of refrigerating equipment are working is maximum efficiency, minimum service, long life, maximum economy of operation, all of which means the maximum amount of refrigeration service to the user. Every step in the advance toward that goal has been stubbornly fought for and has been obtained only after many years of the most intense research into engineering, production and service methods. All of this to gain a better understanding of the problems and render a better service.

### Design Aims of Manufacturers

Engineering, production, inspection and the service departments of all of the successful producing organizations in the industry are constantly searching for a method or a material by which every possible per cent of refrigeration service to the user might be obtained, and they energetically work to gain and retain that per cent which comes in small figures, but one which has always been positive.

Refrigerating systems today have been designed and are being built that will meet the ever increasing demand for customer refrigeration service and such systems are built around the proper combination or arrangement of compressor, evaporator, controls and refrigerant.

In these systems consideration has been given not only to piston displacement, volumes of liquid, lubrication, pressure, temperature, density, gravity, gas velocity, heat transfer factors, manifolding and materials, but also technique, process specifications which have never been published, knowledge and experience. None of the systems now being marketed were designed and redesigned, built and rebuilt, tested and retested in one day, but over periods of months and years of concentrated effort to reach the point where they are today.

### 'Changeovers' Hurt Reputation

Any major change to a system by anyone not understanding all details of the problem places the manufacturer of that system in a hazardous position, and his reputation may be jeopardized if he allows such changes to be made. It is not logical to assume that scant knowledge of refrigerants or refrigeration will permit of only a few relatively minor changes to be made to a system and expect the customer to be satisfied.

Should all of this slow, but positive development work be discarded, disregarded or destroyed and the industry injured merely by the replacement of the refrigerant in a system originally designed to use some other refrigerant? Emphatically—"NO."

Anyone who desires to use Freon in an already existing system originally designed to use carbon dioxide, ammonia, methyl, chloride, sulphur dioxide, isobutane or ethyl chloride without going to any special trouble will find Mother Nature, who has absolute control over certain laws used in refrigeration, standing in his way.

### No Simple Way to Do It

Freon can be used and maximum service can be rendered when complete knowledge is incorporated into design of the various component parts of this system. Successful changes cannot be made merely by the replacement of belts, pulleys, expansion valves, adjustments to control mechanisms, addition of springs here and there, oil, cleaning or any other suggested methods. One remaining change that should be included with those suggested changes, and one which has never been mentioned, is that the name plate of the original manufacturer should be removed from the systems and its identity be lost, so that the burden brought about by inefficient operation could never be placed on that manufacturer.

Such simple change-overs will literally become "Goldberg" machines of which the manufacturer or the converter can never be proud and most of all the customer who expects refrigeration service for the money which he paid for that change. This applies to the use of carbon dioxide, ammonia, methyl chloride, sulphur dioxide, isobutane or ethyl chloride in systems designed for Freon, as well as the use of Freon equipment or systems designed for some other refrigerant.

It is true that certain manufacturers are building refrigerating systems for use with either Freon or methyl chloride, but it must be remembered that those manufacturers have designed and tested the compressor for that particular purpose, bearing in mind motor loads, valve designs, evaporator manifolding, line installation and many other controlling factors. Such systems were designed, built and tested to do that job and not merely a conversion from one refrigerant to the other.

Would anyone consider it advisable to use kerosene in an aviation engine designed to use high-grade gasoline, fuel oil in an automobile engine designed to use "Ethyl gasoline," pleasure car chassis with a gravel body, coal truck to haul yeast cakes, ammonia in a $CO_2$ or $SO_2$ system, $CO_2$ in a methyl chloride or ethyl chloride system or methylene chloride in a reciprocating type of system and expect it to render service?

Any reduction in the performance of the system would not only cast reflections on the original manufacturer and the one making the conversion, but also on the merits of the particular refrigerant used.

### Unit Built for the Refrigerant

When manufacturers produce a new line of refrigerating systems, using a new refrigerant, you can be assured that the system was designed for a particular purpose using a particular refrigerant and that the system did not come into being just by some few simple changes. The problem is not so simple as that.

Certain major changes must be made to the system when using various refrigerants and these changes will be pointed out in rather a superficial manner to give some idea of the outstanding differences.

## Vapor Displacement

For a given temperature or load condition the displacement will be dependent upon refrigerating effect per pound of the refrigerant and the volume of the vapor per pound. Given below is a comparison of the displacement and motor loads.

* * *

| | Theoretical displacement cubic feet per minute | Per cent increase or decrease in displacement and motor loads for same B.t.u. capacity | | | | |
|---|---|---|---|---|---|---|
| Freon | 5.815 | 0 | —5 | —36 | —49 | —76 |
| Methyl chloride | 6.091 | +5 | 0 | —33 | —47 | —75 |
| Sulphur dioxide | 9.084 | +58 | +49 | 0 | —21 | —62 |
| Isobutane | 11.497 | +97 | +89 | +26 | 0 | —52 |
| Ethyl chloride | 23.977 | +312 | +294 | +164 | +108 | 0 |

* * *

The changing of only the motor size to compensate for the change in load without consideration to speed or B.t.u. capacity results in overloaded condensers and marked increase in cost of operation.

Since the bore, stroke and compressor pulley size of the compressor cannot be changed in the field, the only change that can be made is the change in size of the motor pulley (and belt length) to reduce speed.

Changing from isobutane to Freon, for example, requires 49 per cent less speed for the same B.t.u. capacity and motor load, but the motor pulley cannot be decreased in diameter to that extent without producing too small a radius on the belt with resulting belt failure.

In addition, any change to the compressor speed will upset the dynamic balance of the compressor which was originally designed to operate at only one predetermined or constant speed. If speeds are not changed, and only a larger motor installed the horse power required will be increased 97 per cent, which will overload the condenser and increase cost of operation. The answer to this particular problem is:

"No, leave that problem to the manufacturer."

## Volume of Liquid

The amount of liquid refrigerant that must be metered or throttled through the orifice of an expansion or float valve will be dependent on the characteristics of the refrigerant used. Given below is a comparison of the volumes required.

* * *

| | Cubic inches per minutes | Per cent increase or decrease in volume | | | | |
|---|---|---|---|---|---|---|
| Sulphur dioxide | 28.9 | 0 | —31 | —35 | —65 | —68 |
| Methyl chloride | 41.7 | +44 | 0 | —5 | —50 | —54 |
| Ethyl chloride | 44.2 | +53 | +6 | 0 | —47 | —51 |
| Freon | 83.9 | +190 | +101 | +90 | 0 | —8 |
| Isobutane | 91.1 | +215 | +119 | +106 | +9 | 0 |

* * *

Since the orifice size and needle cannot be changed in the field it is necessary to obtain new valves from the manufacturer. Leave that problem of manufacture and design to him, as the flow of liquids through an orifice is dependent on many factors such as, pressure, velocity, density, viscosity, and shape of orifice.

Obviously, the sizes of liquid lines will be dependent on the volumes of liquid refrigerant to be passed from the receiver to the valve.

## Pressure

Given below are shown the pressure of certain refrigerants at various temperatures.

* * *

| | Gauge Pressures at Various Temperatures | | | | | | |
|---|---|---|---|---|---|---|---|
| | –20° F. | 0° F. | 20° F. | 40° F. | 60° F. | 80° F. | 100° F. |
| Freon | 1 lb. | 9 | 21 | 37 | 58 | 84 | 117 |
| Methyl chloride | 7 in. | 4 lb. | 14 | 28 | 46 | 72 | 102 |
| Sulphur dioxide | 18 in. | 9 in. | 3 lb. | 13 | 26 | 45 | 70 |
| Isobutane | 15 in. | 6 in. | 4 lb. | 12 | 24 | 39 | 59 |
| Ethyl chloride | 24 in. | 21 in. | 15 in. | 8 in. | 2 lb. | 10 | 20 |

* * *

In certain cases the necessary changes in adjustment to control apparatus may be made providing wide enough range of adjustment was built into the device, but this is seldom the case. Once again the manufacturer is best qualified and equipped to make this change in design.

## Density of Vapor

Density of the refrigerant vapor has a direct bearing on gas velocities through evaporator tubes, suction line, suction valve, discharge valve, discharge line and condenser tubes and when consideration is not given to this very important point, pressure drop and losses in efficiency will take place due to restrictions.

The denser the vapor the larger the suction and discharge lines required and most important of all the larger the diameter and lift of the suction and discharge valves required. Suction and liquid lines may be changed in the field, but compressor valve design for capacity and quietness of operation is a problem only for the manufacturer.

## Gravity of Liquid

Consideration must be given to gravity of Freon, oil solutions which may vary greatly in order to obtain proper buoyancy of float valves which may be on either the high or low sides of the system. Gravities of the refrigerants under consideration are given below for temperatures of 5° F.

| | Specific Gravity at 5° F. |
|---|---|
| Sulphur dioxide | 1.475 |
| Freon | 1.445 |
| Methyl chloride | .980 |
| Ethyl chloride | .948 |
| Isobutane | .600 |

Leave that problem of float design to the engineering department of the manufacturer, as that is where the problem is best handled.

## Lubrication

Use of mineral lubrication oils when using various refrigerants is a problem of the lubrication expert and is a subject that would fill volumes and which will not be covered here, due to lack of space. Some of those details were covered quite thoroughly in an article on lubrication prepared by the Texas Co. and which appeared in the October 2 issue of ELECTRIC REFRIGERATION NEWS.

A better understanding of what lubrication really is and the proper methods to be employed has called for rigid specifications to be established and the development of new and improved refining methods. Always obtain the proper oil or recommendations for oil from the manufacturer of *the particular system.*

Other very important subjects which the engineering department of the manufacturer considers are viscosity of refrigerant liquid and vapor, thermal conductivity of liquid and vapor, solvent action of refrigerant on oils, surface setting characteristics of the refrigerant, methods of manifolding and many other very important features. An almost endless number

(*Concluded on Page 9, Column 1*)


4 GOOD REASONS for using V-METH-L VIRGINIA SMELTING

(Virginia Methyl Chloride)

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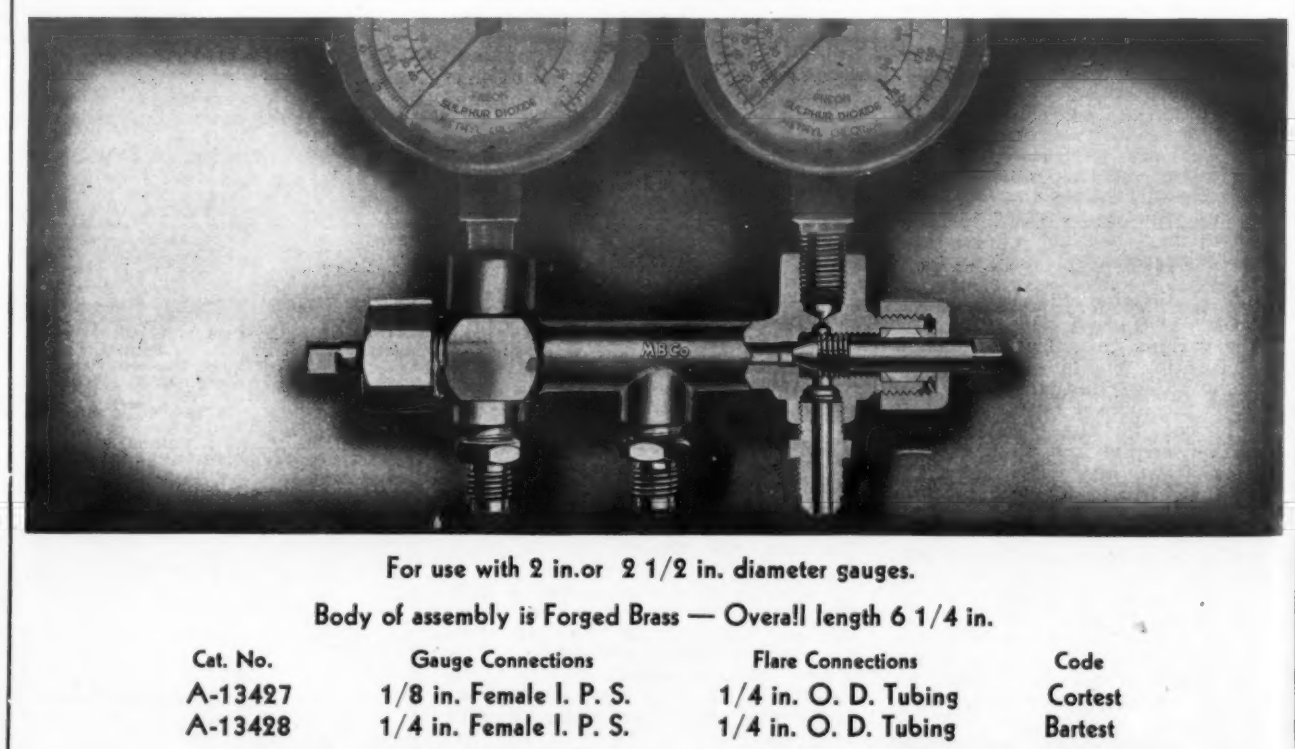
MUELLER BRASS CO. *Testing Manifold*

(Pressure gauges not included)



For use with 2 in.or 2 1/2 in. diameter gauges.

Body of assembly is Forged Brass — Overall length 6 1/4 in.

| Cat. No. | Gauge Connections | Flare Connections | Code |
|---|---|---|---|
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| A-13428 | 1/4 in. Female I. P. S. | 1/4 in. O. D. Tubing | Bartest |

MUELLER BRASS CO. Port Huron, Michigan

## R. J. Thompson Warns Against Changing Refrigerants

(*Concluded from Page 8, Column 5*)

of conditions or combinations can be produced and it is only the proper coordination of those principles that makes possible efficient equipment.

It is realized and the fact appreciated that many developments to refrigeration equipment has been brought about as the result of some very ingenious and resourceful men in the field who are very close to the problem of customer requirements, but most of the refinements that have been incorporated into the present systems are the result of long development periods after the creation of the idea which was possibly very crude at the time of inception.

Much credit is due to those individuals who in many cases and of necessity have served not only as engineers and service men, but as salesmen as it was their problem, in many cases, to keep equipment sold.

One cannot help but be greatly impressed by the developments to refrigeration apparatus after reviewing the splendid articles, which appeared in the October 2 issue of ELECTRIC REFRIGERATION NEWS, on such subjects as development in compressor manufacture, developments in gasket materials, development in shaft sealing, development in rubber products, development in forced-feed lubrication, development in condenser size and design, development in lubrication. This certainly should convey the idea that it is not a smple problem to change from one refrigerant to another in equipment originally designed to use some other refrigerant. The following is quoted from one of the articles:

". . . knowledge and technique, gained through years of experience, go a long way toward solving each individual problem."

### Recommendations

When manufacturers and field men are called upon to make change-overs of present equipment, and to charge the system with Freon, our recommendations are:

1. It is not desirable or advisable and is considered poor engineering practice to use a refrigerant in a system originally designed to use some other refrigerant with widely different characteristics.

2. Before making any changes to a system, obtain recommendations from the original manufacturer, if still in business, otherwise use same refrigerant for which the system was originally designed.

3. Orphan systems requiring minor changes should be charged with the refrigerant originally used, or better still, the system should be scrapped and replaced with a modern 1936 system.

4. The task of converting systems built for other refrigerants to use Freon is one which should be left to the manufacturer and not attempted by the service organizations in the field.

There is something built into successful refrigerating systems, other than refrigerants or other materials which cannot be measured with gauges, thermometers, and meters; they are:

Knowledge of the refrigeration problem.

Proper application of that knowledge—

Technique—

Experience.

CUSTOMER SATISFACTION.

The last is most important of all.

## M. E. Lord to Direct All G-E Refrigeration Manufacturing

SCHENECTADY—Manley E. Lord, secretary of the manufacturing committee of the General Electric Co. since July 1, 1930, has been promoted to a new position as coordinator of all refrigeration manufacturing units of the company, according to W. R. Burrows, vice president in charge of manufacturing.

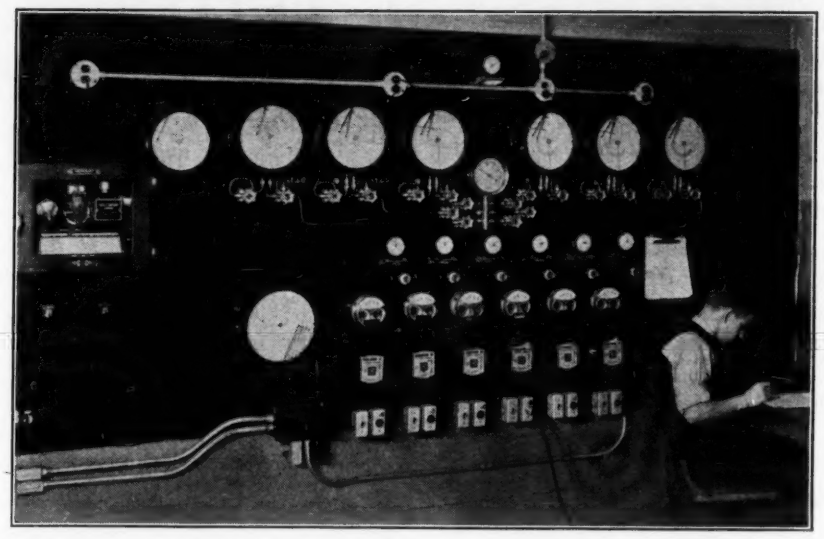
Mr. Lord will be succeeded as secretary of the manufacturing committee by Armand T. Chandonnet, for the past several years on Mr. Burrows' staff doing special assignments.

Mr. Lord entered the employ of General Electric in 1908 at the Newark incandescent lamp factory. He worked up there to assistant superintendent in charge of production.

In 1917, Mr. Lord went to the Edison Lamp Works at Harrison, N. J., in charge of general production, and in 1920 was made secretary of the manufacturing committee there, W. R. Burrows becoming chairman of the committee on the same date on which Mr. Lord became secretary.

On July 1, 1929, he was assigned to special production work. Six months later, he took charge of the waste and spoilage section of Schenectady Works, continuing in that capacity until his appointment as secretary of the manufacturing committee was announced on July 1, 1930.

## Model Test Board



Automatic instruments which make a record of the operation of refrigerators, have recently been installed by Universal Cooler Corp.

* * *

## Higham Describes Testing Board Used by Universal Cooler to Check Performance

By William Higham, Chief Engineer, Universal Cooler Corp.

MEASURE of perfection in a product under service conditions is an accurate gauge of the engineering and inspection control of production, which, in turn, receives its inspiration from the results presented by the test room.

The test room, therefore, must be so manned and equipped that its findings are thoroughly accurate, reliable, and final, otherwise production would suffer and disastrous loss ensue.

### Relied on Operator Before

Until the comparatively recent development of accurate, automatic mechanical recorders, the refrigeration industry had to depend upon the reliability, honesty, and skill of its test-room operators plus the hazard of temperamental valves or other parts, which might take a brief siesta during the night when not under inspection, and then proceed to function normally thereafter. Yet the tests taken off by the operator in good faith in the morning could, and often times would, be used as the basis of a production order and the misleading data might not be caught and corrected until after serious loss involving production, service, and sales.

Accompanying photo is of an instrument board for automatic recording of the various tests to which household refrigerators are subjected which has recently been installed by Universal Cooler Corp. It represents an assembly incorporating the very latest proven scientific achievements in the development of accurate and reliable automatic recording instruments.

### Records of Controls

A Tag pressure control records suction and discharge pressure; Telechron clocks indicate running time and test starting time; G-E watt-hour meters give power consumption during test time, and a Bristol Time Recorder registers cycles per hour.

Room temperature and room temperature control are charted by Tag temperature recorder and Penn thermostat respectively, while a Leeds and Northrup Micromax records the temperature inside the cabinet.

Loransen precision-type indicating pressure gauge is manifolded to all stations for convenience in following through suction pressure on one or more cycles at any desired time. To obtain starting amperes or running time wattage, each station is wired up to a handy outlet and switch box on instrument panel, and by means of a three-point plug, Weston ampere and watt meters can be plugged in at a moment's notice without interfering with the test.

This Universal Cooler instrument board is conveniently mounted in the engineering department, and the connections are hooked up through a wall to the adjoining test room, thus obviating the necessity of entering after the set-up is made.

## Synthetic Rubber Used for Sealing Devices

DEEP WATER, N. J.—DuPrene, a synthetic rubber manufactured by E. I. du Pont de Nemours Co., Inc. at its new plant here, is now being used by the refrigeration industry in the manufacture of sealing devices, state officials of the du Pont rubber chemicals division.

The claim is made that DuPrene compositions will withstand higher temperatures than those of natural rubber, are more resistant to oils and chemicals, and have less tendency to crack when repeatedly stretched and flexed.

## Wrong Power Rate Quoted In Survey Report

It has been called to our attention that in the article "Nebraska University Study Delves Into Kerosene Units & Gives Comparative Data," published in the Oct. 16 issue of ELECTRIC REFRIGERATION NEWS, the cost rate for electric current consumption in figuring the monthly cost of operating an electric refrigerator was given at 35 cents per kilowatt-hour, when it should have been 3½ cents per kilowatt-hour.

## Operation, Application & Installation Of Magnetic Stop Valves

By F. D. Turner, Alco Valve Co., Inc., St. Louis

FOR temperature control refrigerating systems, a thermostat or presssure switch is used to operate the valve. When the cold fixture, room or substance becomes warmer than the desired temperature, the themostat or pressure switch closes the electrical circuit, thus energizing the magnetic coil of the valve and causing the plunger to lift the valve pin from its seat. The valve is then open permitting a full flow of refrigerant.

When the unit comes down to the required temperature, the thermostat or pressure switch breaks the electrical circuit, causing the plunger and valve pin, aided by the compression spring, to drop into place, thereby instantly and completely closing the valve.

For liquid level control, the valve is wired through a transformer-relay to a float switch.

When the liquid in the evaporator falls below the indicated level, the switch opens the valve. When the desired liquid level is obtained, the switch closes the valve.

### Application

Magnetic stop valves *can not* be used as expansion valves, but are for application within their rated capacity where a positive stop is required. One important application is where very close temperature control is required in one or more units of an automatic system.

Another application is where the temperature difference between the evaporating refrigerant and the refrigerated area or substance is less than 10° F. Where an extremely small temperature difference exists, the automatic valve feeding the evaporator may possibly not close or stay tightly closed during shut down periods.

This application is especially important on low temperature units in a system containing other units having a higher temperature. Another application is for controlling the liquid flow in connection with a low pressure float switch for flooded evaporators.

### Installation

Magnetic stop valves are only for installation in horizontal lines and in a vertical position, ahead of any and all expansion or other pressure reducing valves. A filter should always be used on the inlet side of the valve regardless of any master fitter that may exist elsewhere in the system.

Full opening, hand-operated stop valves are recommended for installation ahead of and behind each valve and filter combination. The valve may be placed in any convenient location where the temperature surrounding it is not overly warm. It may be used with perfect satisfaction inside cold rooms or on pre-cooled liquid lines.

The fuse block containing the proper magnet protector must be placed in the electric wiring to each valve. Never connect the valve directly in a motor circuit. Be sure the flow of refrigerant is in the direction indicated by the arrow on the valve body. Never twist the terminal box. Use rigid conduit with waterproof joints and fittings. Seal the terminal box joint with a waterproof cement.

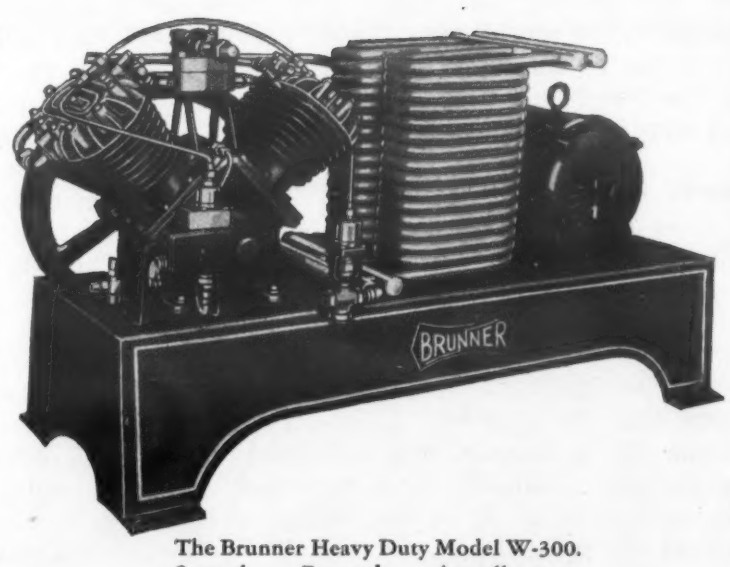
If for any reason, you must take the valve apart, seal all exposed joints with waterproof cement when re-assembling. Be sure the electrical characteristics of the valve correspond to the current available.


The STAMINA of a Bear

The ability to keep tirelessly forging ahead . . . fighting obstacles . . . coming out a winner. That's stamina. And for that Brunner Refrigeration Units are famous.

Take this Brunner Highside (right) as an example. Every detail of its construction spells "stamina". One look at the way it is built will convince you that here is no ordinary 3 H. P. unit but a highside built to oversize proportion to give the extra margin of performance that means real economy.

Get acquainted with this and the whole Brunner line—8 compressors and 41 highsides in a range from 1/6 H. P. to 15 H. P. for *every* commercial requirement. A card to us today will bring your free copy of the Brunner Refrigeration Catalog. Brunner Manufacturing Co., Utica, N. Y., U. S. A.

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Brunner

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# Why Bring That Up?

SALES EXECUTIVES who go through ELECTRIC REFRIGERATION NEWS each week with a fine-toothed comb (and most of them do) have been asking us recently why the NEWS is paying so much attention editorially to service information. "Why bring that up?" they ask. Now that electric refrigeration systems have been improved to so fine a point, service is no longer a great problem in the industry—or so runs the attitude of the sales managers. To answer their question in the same vernacular in which it has been propounded: "Brother, that's what you think."

We do not mean to infer that electric refrigeration machines are unreliable and need lots of mechanical attention. Far from it. The sales executives are exactly right in believing that refrigeration systems have been vastly improved, and are now, relatively speaking, models of efficiency. It is not the imperfection of individual machines which has made the Service Problem loom up so big, it's the *number of machines now in use.*

## Situation No Longer Under Control

A few years ago—even when machines may not have been so foolproof and troubleproof as they are today—manufacturers had the service problem pretty well in hand. They were able to train and maintain staffs of competent service men at strategic points all over the country, and thus handle every complaint that arose. Today, however, with millions more refrigeration systems in use, with thousands of orphan makes out in the field, and with the prospect of added millions of machines going into operation in the very near future, the refrigeration service business has grown amazingly. The need for information on service, as reflected in letters to the editors of the NEWS, has become pressing; and the NEWS has been striving to meet that need adequately and authoritatively.

## Nearly 7 Million in Use

After making the deductions for exports to foreign countries, for stocks now in the hands of distributors and dealers, and for units which have been discarded or replaced, it is estimated that there are between six and seven million electric refrigerators now in use in American homes and apartments.

Now it is obvious that all those electric refrigerators require a certain amount of *service,* and that means work for the trained refrigeration service man.

But that simple fact does not tell the whole story, because a lot of things have happened, and more developments are in process, which indicate that service men are not going to run out of work to do for a long time to come, if ever.

In the first place, the big manufacturers of electric refrigerators have not stopped selling. They expect to keep on selling a million and a half, maybe two million units a year. They know that there are over 20 million homes in the United States which are wired for electricity and that only about *one-third* of these homes have been equipped up to the present time.

## Building Boom Coming

They also know that there is going to be a big new-home-building boom during the next few years because of the acute shortage of housing all over the country. And by the time that market is supplied, they realize that the first units sold will be getting pretty old. Then the replacement business will begin to absorb an important share of the production.

The foregoing picture of the enormous job for service men to install and repair household refrigerators is, however, only an *introduction.* We haven't mentioned *commercial* and *industrial* applications of refrigeration and we haven't said a word about the whole big new field of *air conditioning.*

## Air Conditioning Adds to Problem

Air conditioning is coming, it is coming fast, and in "a great big way." It is the next big American industry, and the refrigeration service man is going to find the job of installation and maintenance of this larger scale equipment *"right in his lap."*

So, it is clear enough to anybody who knows what is going on, to anybody who can read the figures and tell what they mean, that service men are going to need *information* and plenty of it.

First of all, the service man needs to know the *fundamentals* of refrigeration. He must know *how* the equipment works and *why.* After that, he must be informed *in detail* about all the types and makes of systems and their component parts. Naturally, he cannot be expected to *remember* the exact amount of refrigerant charge, the size of the belt, or type of control on *every model* of *every make* on the market.

All that information should be compiled and arranged for him in convenient books always available for quick reference. Furthermore, the information must be kept *up-to-date* as new models and makes appear on the market each season. That is a job for an independent publisher, one who is not operated or controlled by any manufacturer or special interest.

## Master Service Manual

The Business News Publishing Co., publisher of ELECTRIC REFRIGERATION NEWS, is now in its tenth year of service to the refrigeration industry. This organization in Detroit has accumulated experience and the facilities for distributing information to all groups in the field. It is known all over the world for speedy reporting of news and for the reliability of its data.

The MASTER SERVICE MANUAL, to be published about Jan. 1, 1936, will be the most complete guide ever compiled for the service man. Material for this manual has been running serially in ELECTRIC REFRIGERATION NEWS since April 10 of this year. The author, Mr. K. M. Newcum, is a man of many years practical experience with refrigeration service problems. He has taught classes of beginners and knows how to explain installations and servicing operations in simple and understandable terms.

The MASTER SERVICE MANUAL is not designed as a text book for engineering colleges, but it will admirably serve the needs of the trade schools, shop instructors, and particularly the man who is now engaged in actual service work but who needs more and better information about how to solve the problems he encounters from day to day.

## Subscribers Like This Information

Concurrently the NEWS has been publishing a great deal of correlative, interpretative, and amplifying information of a technical and engineering variety—all of which has apparently hit the mark, judging from the written and oral testimony of subscribers.

Henry Ford has been quoted as claiming that one of the chief reasons for the phenomenal success of his business enterprise has been his insistence on the dictum that obligation to the consumer does not end with the sale, but that the *machine should be kept in satisfactory operation.* Likewise, the oldest heads in refrigeration will probably agree that following the same principle should help insure the future success of this increasingly great industry. The importance of an adequately informed and equipped service division of the refrigeration industry cannot be overemphasized.

# LETTERS

## Objection to an Exception

The City Ice and Fuel Co.
Morrison, Ill.

Editor:

The article about kerosene units on page 6 of your Oct. 16 issue proved very interesting to us because of its "Unbiased Comparative Refrigeration Data." However, your note on the matter of current consumption seemed an unnecessary effort to make the electric refrigerator appear in a better light and put the ice refrigerator in a more unfavorable light.

We can see no particular discrepancy in the fact that the mechanical refrigerators were shown to consume $2.77 and $2.46 worth of electricity each month at a cost of $.035 per kilowatt-hour. Actual practice frequently confirms this fact, to the discomfiture of those who "pamper" mechanical units through so-called laboratory tests.

The research engineers have been eminently fair in showing ice consumption at 25 lbs. In fact actual practice on 5 to 6 cu. ft. refrigerators of modern design and construction will show results considerably less than this even during the period of the year covered by the tests. In fact our new models show consumption not far in excess of 20 lbs. per day at average room temperatures.

May I recommend that your comparisons be based upon equipment which is really comparative. For instance, it is quite illogical to compare recently manufactured mechanical refrigerators with the average "ice box" in use for many years, when you could make a comparison with modern ice refrigerators which represent very marked improvements in efficiency and economy of operation. We could probably point out various other items in defense of the modern ice refrigerator, but we have observed that your publication is dedicated primarily to "electric refrigeration" so we assume that the news items will be editorially biased in favor of such equipment.

Whenever you do want any substantiated facts regarding ice and the modern ice refrigerator, you are welcome to call upon us as the largest ice company in the country and a leader in the manufacture and sale of modern ice-refrigerated equipment.

T. J. BECK,
Manager, Sales Promotion Dept.

*Answer*: The statement in the footnote relative to ice consumption was based on figures given in the "complete refrigeration service plan" set forth by the Florida Ice Manufacturers Association and published in the July 31 issue of ELECTRIC REFRIGERATION NEWS.

The estimate of this ice association puts the consumption of ice in a *new* 5 or 6-cu. ft. box during the summer months at 1,100 lbs. a month, making our estimate of 30 lbs. daily slightly conservative.

## Sideline Comment

Electric Bond & Share Co.
2 Rector St., New York City

Editor:

I am glad to send you, under separate cover, a copy of the Air-Conditioning Report to Electric Bond & Share operating companies 1934-1935. This is in effect, a supplement to the report of similar scope issued 1934, of which you also received a copy.

Distribution of such reports is necessarily limited, in general, to our own affiliated companies, but copies are available to organizations and individuals who assisted with information or technical data used in compiling the reports. In case you should wish to mention our 1934-1935 report or review it, kindly include a statement to the effect that "the publication is privately issued and copies unfortunately are not available to the public."

I wish to take this opportunity to acknowledge the assistance rendered by, and use made of, material appearing in ELECTRIC REFRIGERATION NEWS. As an observer on the sidelines, so to speak, rather than an active participant in the intensive development of the air-conditioning industry, I must depend to a considerable extent on articles and news items such as appear regularly in your valued publication.

W. F. FRIEND,
Assistant Mechanical Engineer.

(*Editor's Note*: A comprehensive review of the report is planned for an early issue.)

## Inspectors Inspect the News

Westinghouse Electric Supply Co.
2211 West Pershing Rd.
Chicago, Ill.

Editor:

We believe all of our refrigeration inspectors and service men are now reading your publication. The writer feels that the information contained in ELECTRIC REFRIGERATION NEWS each week is valuable knowledge for our employees in this work.

P. M. DECKER, Manager.

## Patterson and Chalmers

Crosley Radio Corp.
Cincinnati, Ohio

Editor:

Your series of articles on John H. Patterson in ELECTRIC REFRIGERATION NEWS is a practical treatise on specialty selling that shows how by example.

I have been somewhat surprised, however, that none of the sources quoted mentioned Hugh Chalmers, for years N.C.R.'s most outstanding sales manager. Chalmers, more than any other N.C.R. official of the time, built up good will for National Cash Registers and made the company an inspiration to salesmen and officers of other companies.

Chalmers received a tremendous amount of publicity as a $100,000-a-year sales manager, and there were few, if any others, at the time. Chalmers either instituted or made famous by their achievements the 100-Point salesmen, who were as famous in their day as G-men are today.

Chalmers' methods were clean. He was a brilliant, human, and kindly man who inspired the love and loyalty of the men who worked for him and who knew him.

It was my privilege to make Hugh Chalmers' acquaintance in 1915, after he had left National Cash Register and organized the Chalmers Motor Car Co. in Detroit.

I had traveled to Dayton with Elbert Hubbard as Hubbard's secretary, and there met and talked with different officials of the National Cash Register Co. John H. Patterson was not in the city at the time, but we were shown and told many of the things that have been so well described in your series of articles.

A year or two later I made another trip to Dayton, and wrote an article on N.C.R.'s sales and advertising program for *Advertising & Selling* magazine.

At Detroit we met Chalmers, and had a long and interesting talk with him. Chalmers was one of the most able and practical sales executives ever developed in this country. He put salesmanship on the high plane of a genuine service to the buyer.

Chalmers' methods were not those of Patterson, with the famed or ill-famed "grave-yard" of cash registers of competitors that had gone under with the on-slaught of Patterson's "ruthless" methods that led to his prosecution and conviction in a Federal Court.

This conviction was later set aside on an appeal which was heard after the Dayton flood in 1913, in which many lives were lost and much property destroyed. Patterson turned over the full resources of his plant and equipment and saved much human life that unquestionably would have been added to the toll.

The ill-will that had existed towards Patterson was swept away from the hearts of the people out of gratitude for a noble work. What harm had been done by his competitive methods could not be undone, and it had been done in a day of ruthless competition in which Patterson instead of someone else had triumphed.

There was agitation for a pardon for Patterson; but, fighter that he was, he insisted on vindication and the conviction was set aside on the appeal.

Perhaps no one can say how much of it was due to points of law and how much to compassion for the man who had done a noble and heroic service to his fellow townsmen in the Dayton disaster.

An insight into Chalmers' character was shown by the high plane on which he conducted the Chalmers Motor Car Co. He featured "Cars and Character," believing in an honest car made and sold under conditions of fair management and treatment of his employees as well as of his dealers and the buyers of his cars.

Chalmers was a rare combination of personal charm, the highest business principles, great sympathy and love for his fellowmen, and an amazing selling ability. No true picture of the achievement of N.C.R. is complete without a recognition of the great and favorable part he played.

JAMES W. BECKMAN.

## Explosion in Belgium

Societe Anonyme Des Ateliers
Nimy lez Mons, Belgium

Editor:

Having read the different articles appearing in your always interesting paper, on the subject of the explosion in Chicago, we hope to interest you in learning the following facts:

Last year one of our clients from Antwerp, possessing one of our ammonia compressors, with a shell and tube condenser of 414mm, or 16 in. in diameter, made the mistake in his installation of charging it with some oxygen instead of ammonia—a welding gas cylinder was left in his shop and the workman in charge of the job had put the cylinder of oxygen with the cylinders of ammonia.

A few minutes later, fortunately in the absence of the workman, the mixture of oxygen and oil at a high pressure and temperature exploded, causing a tearing of the casing for ¾ of the circumference of the tube plate, and a tearing in the length of the shell for about 47¼ in.

Director.

# Sales Idea of the Week

By V. E. (Sam) Vining, Director of Department Store Sales, Westinghouse Electric & Mfg. Co.

If I ever meet the guy who first referred to the "Science of Selling" I am going to wring his neck as a matter of routine.

I feel the same way about the man who started all this hokum about the "Art of Selling."

Bunk.

Selling is more exact than "Science" and certainly more stable than "Art." Even a professor of mathematics can't prove two plus two *always* equals four— the best he can do is tell you that, "To the best of his knowledge, *it always has.*" And as for Art, every generation of high-brow critics, their eyes on the past, has failed to recognize the genius of its own contemporaries.

Selling is a business—it starts with no assumptions, and is dependent on no self-appointed juries of approbation.

Successful selling is not a thing of mystery—there are no tricks about it. Like "All Gaul," it is divided into three parts:

First—Know your product and learn to talk about it authoritatively and interestingly.

Second—Find someone to listen to your story who has the need and the power to buy.

Third—Tell the story and ask 'em to buy.

The trouble is, you and I have been so filled with all this stuff and nonsense about "Science" and "Art" that usually, by the time we get down to actual selling, we forget three things—

First—Know our product and learn to talk about it authoritatively and interestingly.

Second—Find someone to listen to our story who has the need and the power to buy.

Third—Tell the story and ask 'em to buy.

The biggest deals in the history of all selling have been put over by lawyers, bankers, engineers, diplomats—men who knew the fundamentals, but never even thought of themselves as "salesmen."

## Failures in Electrical Field Up Slightly

NEW YORK CITY—Bankruptcies among manufacturers of electrical supplies during the first eight months of 1935 have shown a slight rise, compared with figures for the whole of last year, reports Dun & Bradstreet, Inc., in a recent survey of the electrical supply trade.

For the months of January to August, inclusive, a total of 10 failures was listed, involving liabilities of $203,297, compared with 18 involving liabilities of $233,588 for the entire 12 months of 1934. Last year's figures were a decline of 53.2 per cent from the $499,118 in 1933, and lower by 85.1 per cent than the all-time high reached at $1,571,258 in 1931.

While the defaulted indebtedness was but little more than half that for the entire 12 months of 1934, failures among wholesalers and retailers for the first eight months of 1935 also increased, reaching a total of 40. This compares with 49 for 1934, which established an all-time low, and was a drop of 53.8 per cent from the 1933 total of 106. It represented a fall of 71 per cent from the record high of 169, reached in 1932.

| Year | Manufacturers Number | Liabilities |
|---|---|---|
| 1927 | 19 | $897,592 |
| 1928 | 16 | 257,400 |
| 1929 | 13 | 232,900 |
| 1930 | 24 | 453,848 |
| 1931 | 57 | 1,571,158 |
| 1932 | 40 | 1,306,119 |
| 1933 | 31 | 499,118 |
| 1934 | 18 | 233,588 |
| 1935* | 10 | 203,297 |

| Year | Wholesalers and Retailers Number | Liabilities |
|---|---|---|
| 1927 | 157 | $2,259,738 |
| 1928 | 126 | 4,047,229 |
| 1929 | 123 | 2,455,900 |
| 1930 | 143 | 2,509,904 |
| 1931 | 160 | 2,250,976 |
| 1932 | 169 | 3,283,054 |
| 1933 | 106 | 1,840,666 |
| 1934 | 49 | 635,054 |
| 1935* | 40 | 377,119 |

*January to August, inclusive.

## General Electric Sales Up for 9 Months

SCHENECTADY—Sales billed by the General Electric Co. (all divisions) during the first nine months of 1935 amounted to $149,173,275.12, compared with $121,735,122.98 during the corresponding period last year, an increase of 23 per cent, President Gerard Swope reported last week.

Profit available for dividends on the common stock for the first nine months of this year was $17,205,332.37, compared with $11,714,247.20 for the first nine months of last year. This profit is equivalent to 60 cents a share for the first nine months of 1935, as compared with 41 cents a share for the first nine months of 1934.

Mr. Swope pointed out that last year three dividends of 15 cents each were paid on the special stock out of earnings of the nine-month period, while for this year there is no such deduction from earnings as the final payment made upon retirement of the special stock on April 15 was provided for last year.

This is equivalent to almost 7 cents a share of common stock for the nine months.

A dividend of 20 cents a share was declared in September this year payable on Oct. 25 to stockholders of record Sept. 27. This makes 50 cents a share for the first three quarters this year, compared with 45 cents paid for the corresponding period last year.

## Electromaster Adds To Plant Facilities

DETROIT—A 50 per cent increase in sales of Electromaster electric ranges during the first nine months of 1935 has made necessary a substantial expansion of the company's plant space, reports Gerald Hulett, vice president of Electromaster, Inc.

The company has taken over a second plant, to be known as Electromaster Plant No. 2, which will afford a 40 per cent increase in floor space, and corresponding increases in production and shipping facilities.

Sales this year are reported to be the highest in the history of the company. Monthly sales curves, Mr. Hulett states, have shown a constant rise since the first of the year, with no evidence of the seasonal slump.

The company has recently added to its sales staff a number of dealer and utility contact men, to handle new business in the territory east of the Rocky mountains.

## Mahler Leaves For Trip To South America

NEW YORK CITY—P. M. Mahler, president of the P. M. Mahler & Co., Inc. here, will sail soon for South America on behalf of the various manufacturers which the company represents as foreign sales manager. Mr. Mahler's four months' itinerary will include Panama, Chile, Peru, Brazil, and Argentina.

## Freeman Wins Vermont Kelvinator Contest

RUTLAND, Vt.—Awarding of the "Sweepstakes Cup" to William Freeman's, Hoosick Falls, N. Y., division recently brought to a close the annual Refrigeration Sweepstakes of the Central Vermont Public Service Corp., Kelvinator distributor here. Sales for the 11-week period exceeded the quota by 48.5 per cent.

In this contest, modeled after a horse race, individnal winners are given cash bonuses and prizes, and the winning division gets the cup. Quotas of divisions rather than individual salesman's records are the basis for prizes, so that salesmen in a poorly populated area are not at a disadvantage.

Hoosick Falls division won the cup for the third time during the past five years. This organization also tied with the Middlebury division one year.

Quota for the campaign was set at 167 units, but actual sales numbered 248 units. A. H. Alcott, merchandise sales manager for Central Vermont Public Service Corp., reports that deluxe model Kelvinators predominated over other styles in sales volume during the contest.

## Dealer's Letter of Welcome Shows Appliance Uses

OSHKOSH, Wis.—New aspect of playing up service in selling electrical products is that employed by Wilson's, electric refrigerator dealer here who sends out welcoming, informative letters to all new residents of this city.

Letterheads for these good-will builders show a cut-away section of a house, with installations of the various electrical appliances and equipment which the firm sells printed in red. At the sides of the house, red lines point to the list of items handled by the dealer.

The message suggests that the new resident will want new articles for his home and that Wilson's will be glad to supply him with them. It further states that even if the store does not handle the products desired, it will be glad to tell the new resident where he may purchase them.

## Leonard Dealer Gets 600 Names from One Show

SAN JOSE, Calif.—More than 2,000 people visited the home electrical appliance show held by the Farmers Union, Leonard electric refrigerator dealer here recently. Names of 600 prospects, and a number of sales, were secured during the show.

Practical demonstration of appliances were given by five women demonstrators and four salesmen throughout the exhibit. Of the 600 prospects, 125 indicated an immediate interest in an electric refrigerator or in appliances, declares A. E. Hamilton, manager of the specialty department of the firm.

## Prize Winners Named By Boston Branch Of Kelvinator

BOSTON—Completion of the seven-weeks "Play Ball Contest," sponsored by the Boston branch of Kelvinator Corp., from Aug. 12 to Sept. 27, found the following dealers winners of cash prizes: Metropolitan Refrigeration Co., Boston, $150; Brooks Sales Co., Boston, $100; A. Lippman, Cambridge, $75; and Coleman Supply Co., Dorchester, $25.

Weekly prizes of a Hamilton wrist watch, Elgin wrist watch, and Parker Vacuumatic pen and pencil set, were awarded the dealer who made the greatest percentage of his weekly quota. The quota was based on retail business, on deliveries out of the branch. Each $100 worth of business counted as a "one base hit."

During the first week prizes were awarded to the Metropolitan Refrigeration Co., Boston; Fred W. Davis, Melrose; Parke Snow Co., Somerville.

Aaron Lippman, Cambridge, took first prize the second week. Coleman Supply Co., Dorchester, and Stanley Boyd, Cambridge, also received merchandise prizes.

Winners for the third week were: J. R. Pickering, Cambridge; Metro Sales & Service Co., Everett; Malden Center Garage, Malden. Metro Sales & Service, received a prize in the fourth week's drawing, as did Robert J. Barr, Reading, and Aaron Lippman, Cambridge.

Those receiving prizes for the remaining three weeks, included Brooks Sales Co., Boston; Malden Center Garage; Gorfinkle Furniture Co., Dorchester; Metropolitan Refrigeration Co., Boston; Royal Steam Heater Co., Gardner; Gahm & Erickson, Arlington; Aaron Lippman; George J. Bates, Cambridge; and Sheperdson, Inc., Worcester.

## Davin Conducts Grunow Meeting in Florida For Clare & Co.

JACKSONVILLE, Fla.—J. J. Davin, sales promotion manager for General Household Utilities Co., conducted the dinner meeting at which dealers, guests of Clare & Co., Grunow distributor for Georgia and Florida, were shown the Grunow 1936 line of 17 models, at the Mayflower Roof Garden here recently.

Slides on production processes and manufacturing equipment were also part of the program.

Besides Mr. Davin, F. M. Bewsher, southeastern division manager for Grunow also spoke, as did W. J. Hogan of Clare & Co.

Clare & Co. will open a Jacksonville branch for distribution in north Florida and south Georgia, under the managership of B. F. Redding, Mr. Hogan announced at the meeting.

## Westinghouse Outlines Salesman's Course On FHA Plan

MANSFIELD — Westinghouse Electric & Mfg. Co. is suggesting that its salesmen adopt the following procedure in obtaining refrigerator business financed through the Federal Housing Administration:

"1. Explain to your prospect that the FHA makes it possible for them to buy a Westinghouse refrigerator with no down payment and as long as three years to pay, with interest at 5 per cent.

"2. Get the signed order, instruct customer in filling out the complete information, and have both husband and wife sign the note. Don't erase changes; make out a new form.

"3. Present the papers yourself—to the dealer or designated person in the dealer organization. When approved, deliver Westinghouse.

"4. Collect the full amount in cash from the bank or finance company. You do this by giving them a signed installation certificate.

"Remember—the less you involve customers in complicated discussion and contact with bank or lending agency, and the more you take over the handling of all details, the easier it will be to sell on the FHA plan."


TEMPRITE

is the Entering Wedge to Additional

Refrigeration Orders

When you secure an order for a Temprite Beer Cooler you have sowed the seed of further profitable business.

A Compressor must be purchased.

Keg Storage refrigeration follows.

Back-Bar refrigeration is required as business increases.

Water Cooling—Food Display—Chefs Box—soon follow. Air-conditioning will also be installed by a percentage of customers.

But—this development of business is built upon the successful operation of the first unit sold—the Beer Cooler! Temprite history and performance insure this successful operation.

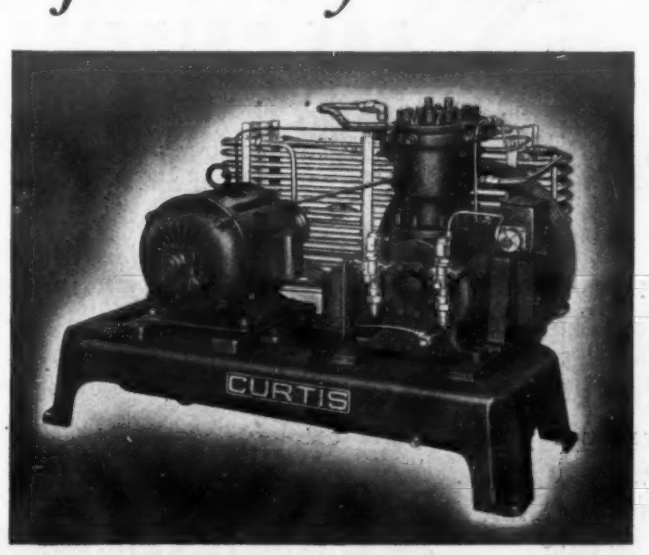
TEMPRITE PRODUCTS CORPORATION
1349 EAST MILWAUKEE AVE. DETROIT, MICHIGAN
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES



CURTIS REFRIGERATION

*Units to fit every need*

Curtis, one of the oldest compressor manufacturers, offers an unusually complete line of refrigerating units—⅛ to 2 H. P. air cooled; ⅓ to 15 H. P. water cooled—reflecting 81 years of successful engineering, designing and manufacturing experience. Some desirable territories are still open for reliable distributors.




81 SUCCESSFUL YEARS ESTABLISHED 1854

*Write for details.*

CURTIS

CURTIS REFRIGERATING MACHINE CO.
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue, St. Louis, U. S. A.

# SERVICE TOOLS

## How to Use Tools Developed Especially for Service Work

By the Engineering Department, Imperial Brass Mfg. Co.

IN the early stages of the refrigeration and air-conditioning industry, the only copper tubing service-tools available were those which were used for work on gasoline and oil lines in automotive service.

At that time, the tube was either cut with an ordinary hacksaw or by filing a groove around the circumference, and then breaking the tubing at the point of filing. The next step was to square the end of the tubing, which doubtless had been cut at a slight angle. This squaring of the tube, which was necessary before flaring, was done with a file.

In refrigeration and air conditioning, the need for greater precision in making up leak-proof joints was due to the penetrating refrigerants which were used. A perfect right-angle cut off the severed tube end was required, and called for a more exacting tool than the type formerly in use.

The first Imperial model tube cutter was patterned on the lines of the old pipe cutter. This cutter made each cut at a right angle to the tube. The cutting wheel, as it cuts, turns down a small amount of metal at the end of the tube. This extra metal provides extra strength for flaring. Where flaring is not required, the reamer on the tubing cutter will quickly remove the extra metal.

The chips, filings, and burrs which are frequent when a toothed blade is used are avoided; and the pressure is so applied by the holding surfaces that no flattening of the tube takes place—a common handicap when a vise is used. Other requirements of a tube cutter are that it should operate easily and be small in overall size, as it is often used in comparatively inaccessible places.

A new "junior" tube cutter of a smaller size has been introduced. It can be carried in the vest pocket. Method of operating the two cutters is the same, and the only precaution required is against making too deep a cut. This has a tendency to throw the tube out of round.

A companion tool to the tube cutter is the flaring tool. This tool replaces the primitive methods formerly used for making flares for S.A.E. couplings. One of the old-time appliances was a tool with small loose dies of different sizes to take the various sizes of tubing, and it was mainly luck if the right size could be found.

Since that time, a common practice has been to use a center punch with a 45° angle and a light hammer, peening or expanding the portion of the tube extending from the tool. With this method a great deal of time and space is required.

In our flaring tool, holes of various diameters hold the tubing for flaring. The design is such that a firm grip is obtained on the tubing, which must be held rigidly in position during the flaring operation. The advantage of this tool is that no hammer is used; and the tubing, instead of being peened and worked excessively, is pressed to shape by means of a yoke with a templet; this forms a perfect flare with a minimum of working or hardening of the tube.

Need of making quick repairs without losing the refrigerant naturally called for a tool designed to seal any portion of the tube by pinching the tubing ahead of the point where work is to be done. When the work is completed, the tool is removed, and the pinched portion of the tubing is again clamped in one of the holes of the tool; by tightening two bolts, the tubing is brought back to practically its original round shape.

### Charging Lines

In charging units with refrigerant there is a very great hazard—that of the tube breaking while this process is being completed—and any charging line should be proof against this menace. Imperial has made special efforts to eliminate this hazard and have a real "safety" charging line.

In addition to the extra strength needed to resist the internal pressure and chemical action of the refrigerant, the tubing must also have tensile strength and be reasonably flexible.

Charging lines are available in various lengths with a ¼-in. female nut on each end. Another type has a brass connection with a ¼-in. male S.A.E. thread on each end, to which a copper tube is added, complete with flare nuts. This makes it possible to make new flares on the copper tubing if the flares become worn or broken. The copper tubing can be replaced should it become too short to use.

### Charging and Testing Units

For charging liquid gas into high side, charging gas into low side, purging gas from gauge lines, purging air or gas from high side, testing low side for leaks, etc., the use of a charging and testing unit is desirable.

The unit with two valves to control the gas or liquid requires frequent opening and closing of the valves. It is necessary that these valves be leak-proof and able to withstand the continual opening and closing.

### Rethreading and Refacing Tool

The very penetrating refrigerants used make it necessary that the seat of the flare-fitting be smooth and free from mars, scratches, grooves, etc. However, even with careful handling, these defects are found on the fittings or valves used in an installation. Many times these are the only parts available, or the cost of a new part makes it prohibitive to discard them. Conditions of this type make a refacing or reseating tool very valuable.

A widely used tool has standard-thread dies which re-cut the thread at the same time that the refacing is done. This assures a seat uniform with the thread. Owing to this feature, the tool invariably makes the seat concentric with the thread. In using Freon and methyl this accuracy in the valve or fitting is very necessary.

The tools mentioned above take care of all the operations which service and installation engineers are required to be ready for on tubing or couplings. An exception is bending the tubing.

In the past, the bending of tubing was done by various methods. Filling the inside of the tubing with sand or rosin and then bending was one way. Another was to insert a coil spring with the same outside diameter as the inside diameter of the tube. The spring was wound into the tubing in the direction of the coil, and then the bending operation took place.

With the large number of installations required nowadays, the time required by the above methods is out of the question. The possibility of sand or resin being left in the tubing after the bend is made is another great objection. The latest type of bending tool which meets present day conditions is portable and can be carried in a service kit. It makes it possible to make a reversible return bend of a very small radius. Another feature is that very little effort is required to bend tubing of heavy gauge in the larger sizes.

## New Wrenches Find Place in Service Kit

By A. F. Wilcox, Bonney Forge & Tool Works

A THOROUGH knowledge and proper tools are the stock in trade of a refrigeration service man. Without knowledge, tools would be useless, and the knowledge without the tools would be equally valueless. "Proper tools to the refrigeration service man mean chiefly wrenches specifically designed for this type of work.

Flare nuts require wrenches having openings ranging from ¾-in. to 1⅛-in. The openings of these wrenches must be accurate to prevent burring the nuts. The wrenches must be short, as there is not room to use a standard open-end wrench. To solve this problem, a short, open-end "S" wrench was designed.

On one model Frigidaire, the switch adjusting nut is very thin. A wrench with average head thickness could not be used. A special switch adjusting wrench, with heads ⅛-in. thick and an overall length of four inches, permits the service man to adjust the switch quickly and accurately.

The compression and vacuum shut-off valves present a difficult problem without proper tools. These valves must be adjusted so that there is no leakage, and yet these valves have square stems ranging from 3/16-in. to 5/16-in. Standard wrenches with these openings would not be strong enough for this work, and in addition, time can be saved by using a ratchet. Two types of ratchet wrenches solved this problem.

Packing nut keys and valve stem keys must be made very strong. The small projections on the packing nut keys must not spring, bend or chip. This problem was solved by using the proper grade of steel, properly heat-treated. The same is true of valve stem keys where little square openings are subjected to strains far above those encountered by tools having similar openings.

## *Safety Council Speaker Warns of Danger In Hand Tools*

LOUISVILLE, Ky.—Without tools, man, who has gained supremacy over the earth, the water, and the air, would become a weak, defenseless creature, declared A. A. Rall, safety supervisor for the Kansas City Power & Light Co., Kansas City, Mo., who addressed delegates last Wednesday morning at a session of the Refrigeration Section of the Safety Congress at the Kentucky hotel. Even in this age of machinery, he said, many operations are still performed with hand tools.

The speaker pointed out that most men do not appreciate the value of their hands until they lose one of them. In the use of both hand tools and machinery, the hands are the members most often subject to accidents, yet the man in industry takes innumerable chances with them, allowing them to become infected, bruised, and mutilated.

Mr. Rall mentioned some of the most common accident causes in connection with the use of hand tools. The slipping of a wrench is a simple, yet a very common hazard, particularly grave in the case of men working on ladders of platforms or other elevated positions.

He discouraged the use of pliers to provide extra leverage for a screw driver in removing a tight screw or a slotted head bolt. The head of a chisel, he said, when it flattens and swells from constant use, should be ground off as a matter of safety.

A claw hammer, by the same token, should not be used to pull heavy spikes. It is also bad practice to use a pipe over the handle of a hammer to secure additional leverage.

One essential thing to remember is this, Mr. Rall said—tools should never be used for a purpose for which they were not intended.

## New Tool Designs Resulted from Demands of Service Work

By J. G. Henry, Henry Valve Co.

RAPID growth of the air-conditioning industry and the strides made in various applications of commercial refrigeration have made the careful selection of service tools more important than ever.

In selecting a tube cutter, particularly for use with hard drawn copper pipe, there are a number of important points for the service man to keep in mind. There is no doubt that tube cutters, when properly designed and used with care, will give far more satisfactory service than hack saws.

A tube cutter will make a perfectly square cut, something that cannot be said for a hack saw. Tubing, that has been cut with a hack saw and then filed, must be cleaned with extreme care in order to avoid the possibility of cuttings and filings adhering to the inside of the tubing and later lodging in various parts of the refrigeration system, resulting in costly trouble in cylinders, expansion valves, and other delicate controls.

### Firm Cutting Wheel Support

In order to make up a thoroughly dependable flare or sweat joint there must be no distortion of the tubing. To accomplish this, the cutting wheel must be firmly supported in the cutting tool so that the wheel will not wobble or cut "threads." It is our observation that the wheel must have a sharp ground edge with a small included angle and be made of a high quality alloy steel so that the keenness is retained for a long term of service.

In avoiding distortion, reduction of friction on the surface of the tubing during the cutting operation is also of great importance. This can be accomplished best by the use of smooth steel rollers in the tube support. Shape of the tube cutter handle is another factor that we consider of importance. It must have an easy hand grip so that a constant rate of feed of the cutting edge can be maintained.

### Factors Affecting Cutting Speed

Speed of the cutting operation is dependent upon three factors: The keenness of the cutting edge, the size of included angle of the cutting wheel, and the reduction of friction.

Cutters to be thoroughly serviceable should be provided with a steel reamer or scraper having ground edges. When working in confined spaces, the value of compactness should not be overlooked.

### Development of Flaring Tool

Another point that can be offered in evidence of the advancement made in service tools is in connection with flaring tools. When low pressure refrigerants were introduced to the refrigeration field a few years ago, the flaring tool used by service men was literally borrowed from the automotive industry. The tubing was held in a block and a flaring pin was inserted in the tube opening. Striking a sharp blow on the pin with a hammer produced the flare.

The main difficulty was that the flare was not properly centered. Uniform thickness of metal in the flare could not be maintained.

In the designing of the flaring tool four essentials are considered, all important: first, the construction of the tool must be such that the flare is truly centered; second, the tubing must be held securely in place during the flaring operation; third, durability must be assured by the sturdiness of construction and the use of proper materials; and, fourth, speed of operation.

### Flaring Tool Instructions

In using the Henry flaring tool, the tube is inserted in the proper size hole in the block. The movable flaring head assembly is then located by means of a pin and hole in the side of the block exactly opposite the tube, thus insuring a properly centered flare. A cam lever, mounted in the flaring head assembly permits rapid closing of the block and exerts maximum locking pressure opposite the tube. An expansion screw in the head of the cam lever compensates for wear on the face of the cam over an extended period of time.

We always recommend that service men apply a few drops of oil on the cone to overcome friction and produce a smooth flared seat. Care must be taken by the novice so that the screw is not turned down too far, resulting in a thinning of the metal in the flare, rendering it susceptible to cracking.

### Use of Bending Springs

Due to their low cost, speed and ease of operation, bending springs are commonly used on tubing which does not exceed ⅝-in. outside diameter. The spring is slipped over the tubing and guided during the bend principally by application of the thumbs placed parallel with the tubing. The bell end of the spring affords a convenient gripping surface for removal after completion of the bend.

Removal of the spring will be facilitated if the tube is first bent through a slightly larger arc than is necessary and finally bent back to the desired angle.

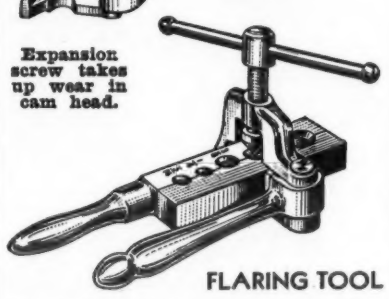
TUBE CUTTER WITH STEEL ROLLERS IN TUBE SUPPORT

Particularly useful for hard drawn copper pipe. Steel rollers reduce friction to a minimum and speed up cutting operation. Replaceable cutting wheel and reamer. Easy grip hand wheel permits continuous feed of cutting wheel. Shielded cutter arm.

No. 10 for 3/16" to ¾" o. d. inc. $2.20
No. 20 for ½" to 1⅜" o. d. inc. 2.75
No. 30 for 1⅛" to 2⅛" o. d. inc. 3.75

NOTE EXPANSION SCREW

Expansion screw takes up wear in cam head.



FLARING TOOL

The fastest, most rugged flaring tool made! Adjustable cam lever locks tube in place in carbonized clamping blocks. Greatest locking pressure always opposite tube itself. For ¼", 5/16", ⅜", ½" and ⅝" tubing. Price each $4.55.

HENRY VALVE CO.
1001-19 N. Spalding Ave., Chicago

If Your Jobber Can't Supply You, Order Direct

ONE PRINCIPLE . . . ONE AIM

To produce most Quality rather than most Quantity . . . and to design, test, and prove each integral element to make the whole a unit of perfection.

★ Your Compressor Needs

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GAUGES AND THERMOMETERS

UTILITY TEST THERMOMETER—Dial 4 1/2" diameter. Designed especially for the service man, but is equally adaptable for miscellaneous test work. Accurate to within plus or minus one degree over entire scale. Clamp for clamping thermometer bulb furnished with each instrument. External (rear) pointer resetting device is provided.

PRESSURE AND COMPOUND GAUGES—2", 2 1/4", 2 1/2", 3", 3 1/2" or any standard larger sizes. Pressure: 200 lbs., 250 lbs., 300 lbs. Compound: 30"—60 lbs., 30"—100 lbs., 30"—150 lbs. Standard 1/4" or 1/8" male or 1/8" female connection.

U. S. GAUGE CO.
44 BEAVER STREET • NEW YORK, N. Y.

# TESTING INSTRUMENTS

## Recording Thermometer, Operation Recorder Used by Service Men to Check Jobs

By John M. Butler, Vice President, Practical Instrument Co.

TWO instruments the service man finds useful are the recording thermometer and operation recorder. The thermometer makes a 24-hour temperature record and the operation recorder a 24-hour motor record.

If the service man also does work in the air-conditioning field, he can make use of the relative humidity recorder, which charts the humidity direct in percentages.

There are four ways the service department can use these instruments. When a refrigerator is installed, a 24-hour temperature and motor record can be run off and the charts placed on file as a precautionary measure in the event of installation complaints.

When a service complaint is received, the instruments should again be called into use for another test period and the new charts checked against the first set. In a certain percentage of cases this will settle the complaint by showing that it is imaginary. In the balance of cases, the comparative check up will promptly indicate the difficulty.

Even when original installation charts were not made, a 24-hour test run with such instruments will show what is wrong with the refrigerator and enable the service man to make prompt repairs. This means that the service department can put the instruments into use at any time and save both labor and money on service calls.

It only takes a few minutes to set the instruments and since they are entirely automatic, the service man can go to another job while the record is being made. This means that the service department can handle an increased number of complaints for the same man-hour expense.

After service has been given, a fourth use for the instruments is to run a check test. With these test charts on file, a complete proof of satisfactory service and a record for future reference is available.

There is very little upkeep service required with these types of instruments. The pen is non-clogging open type and is cleaned with a blotter. Since all delicate mechanism is in the door, which swings out of the way when charts are changed, there is very little danger of damage.

If any serious damage is done to the instrument due to some accident, the entire instrument should be returned to allow calibration as well as repair.

## Friez's New Ai Meter Indicates Velocities, Vacuums, Pressures

BALTIMORE—A new air meter, intended for the study and measurement of pressures or vacuums as well as velocities (in feet per minute) of air inside of ducts or at the face of grilles, fans, and the like, has just been placed on the market by Julien P. Friez & Sons, Inc.

The instrument covers velocities as low as 140 f.p.m. and up to 2,832 f.p.m, and pressures or vacuums from .00125 inches to .50 inches of water. It is equally suitable for use on pressures or vacuums, and no elaborate calculations are required.

Dual scaling, in both inches of water and velocity, is carried throughout the instrument. Zero correction and leveling devices are integral parts of it.

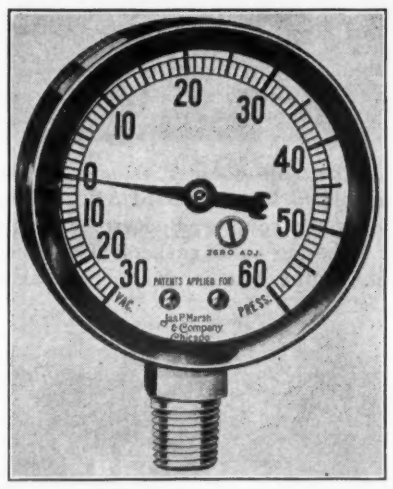
Full operating instructions are included with each instrument. Various uses to which the air meter may be put include: to balance duct systems, to estimate c.f.m. required, to obtain total pressure, to obtain static pressures, to obtain true velocity of air in duct, to obtain c.f.m., to obtain total static pressure loss in system, to obtain static loss in filter or air washer, and to check chimney draft.

## Gauge Has Device for Recalibration in Field

CHICAGO—A "zero adjustment" feature is incorporated in the refrigeration test gauge manufactured by Jas. P. Marsh Corp. to allow for easy recalibration in the field.

The manufacturer points out that refrigeration test gauges are subjected to very severe treatment in the field, being carried in the same service kit with other tools and subjected to considerable "knocking around," so that even though sturdily constructed they are likely to get out of adjustment.

Should the instrument lose its accuracy the service man detects such a condition by means of the positive zero position which is shown on the dial of the instrument.




He corrects it by means of the zero adjustment feature, which resets and recalibrates the entire movement assembly so as to reestablish the proper relation between the bourdon tube and movement assembly. When the indicating hand stands at the positive zero position, the service man knows that his gauge is accurate.

The zero adjustment feature is made in two types—one with the adjustment screw in the dial of the instrument, requiring the removal of the ring and the glass; the other with the adjustment screw in the back of the instrument case.

## Schmitt Tells How to Use and Care for Recorders

By H. M. Schmitt, The Brown Instrument Co.

ANALYSIS of the operating conditions of a refrigerator frequently involves the use of temperature and pressure measuring instruments. These instruments may take the form of a mercury-in-glass thermometer and a small indicating pressure gauge for short time observations, or they may be in the form of recording instruments that will give a record of operating conditions over an extended period of time.

Both temperature and pressure may be recorded on the same chart. The temperature bulb and pressure connections to the instrument are by means of flexible tubing. In the case of ammonia machines, the pressure measuring element and connections should be ferrous alloys rather than copper or copper alloys.

Where the expenditure for a recording meter is justified, it should be of a type using a sufficiently large chart that accurate measurements can be obtained. An 8-in. chart revolving once in 24 hours has proved satisfactory for this service. This provides an instrument with sufficient accuracy and yet it is small enough that it can be placed inside the refrigerator for a test run.

Five feet of tubing between the measuring bulb and the instrument is usually sufficient, but 10 feet will cover practically all installations. This tubing may be coiled and placed with the instrument inside of the refrigerator, or the bulb may be used to explore the temperature of different locations.

The filling medium used in the thermometer system will depend on the temperature range of the instrument. For ranges from —10° F. to +110° F., which covers the average refrigerator and room temperatures, mercury affords an excellent filling. Mercury-filled systems are rugged, accurate and respond quickly to temperature changes.

Greatest use of a recording meter results from a careful analysis of the chart record. In some cases a four-hour test period is sufficient to tell the story; in others a 24-hour test is necessary in order to obtain day and night records for comparison.

The chart record will reveal the heating and cooling rates, the maximum and minimum temperatures, the temperature limits to which the motor control thermostat responds, the length of time the motor is operating, the uniformity of different cycles of operation, and other facts peculiar to the individual installation.

Recording thermometers may be checked by comparison with mercury in glass thermometers. One of the most convenient and accurate checking temperatures is 32° F. which may be obtained by making a slush of shaved ice and water. Lower temperatures may be obtained with a mixture of ice and salt and the higher temperatures may be obtained by mixing hot and cold water to obtain the desired temperature.

Care should be taken that the mercury in glass thermometer and the bulb of the recording thermometer are at the same temperature.

Frequently recording meters will reveal conditions that would normally require long periods of constant observation and the charts marked with the name and number of the machine and the date form a record of the operating condition of the machine.

## Gauges Have Function in Many Kinds of Service Operations

By W. G. Ziegler, Sales Manager, United States Gauge Co.

PRESSURE and compound gauges are used during installation and service of electric refrigerators that use pressure mediums non-corrosive to brass and bronze.

Dial calibrations on pressure gauges should be approximately double the highest working pressure. The pressure scale of the compound gauges should be at least as high a pressure as is developed when the refrigerator is shut down, and the pressure equalized.

The lower the pressure scale, the more accurate the vacuum indication will be on compound gauges.

Where more sensitive pressure and vacuum indications are required than can be expected from commercial gauges and to allow adjustment as needed by the service men in the field, several gauge manufacturers have supplied gauges with frictionless movements to secure greater sensitivity to small pressure changes and have supplied needle type pointers that may be adjusted with an ordinary small screw driver. Such gauges are also supplied with non-breakable crystals.

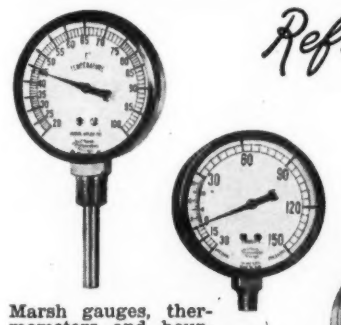
Gauges should be carefully handled in order not to throw them out of calibration, but if they are thrown out of calibration they should be reset by either the service men or returned to the factory for adjustment.

A few of the many uses for pressure and compound gauges when used on combination testing outfits are: charging liquid gas in high side, charging oil in low side, charging gas into low side, purging air or gas from high side, purging gas from gauge lines, setting expansion valves, setting low side controls, testing low side for leaks.

Dial test thermometers are especially useful for the service men, but are equally adaptable for miscellaneous test work on electric refrigerators. Such thermometers are quickly responsive to temperature changes and are calibrated to single degrees. A clamp is supplied so that the bulb of the thermometer may be clamped to the thermostat bulb for setting of thermostats.

These thermometers are supplied with a flexible capillary tubing and the bulb may be installed in the refrigerator for checking thermostats or for checking cabinet temperatures in any spot or corner of box, or ice cube tray temperature, and the door may be closed on the flexible braided capillary tubing without injury to the door or capillary tubing.


Refrigeration Instruments by Marsh



Indicating and Recording GAUGES

Indicating and Recording THERMOMETERS

Mercury SWITCHES

Marsh gauges, thermometers and bourdon tube mercury pressure switches cover every refrigeration application, including ammonia, carbon dioxide, sulphur dioxide, methyl chloride, freon, brine, cooling water, etc.

THE MARSH ZERO ADJUSTMENT (patent pending) ASSURES PERFECT ACCURACY AT EVERY READING OF THE INSTRUMENT. THIS CONSTRUCTION IS STANDARD IN MARSH AMMONIA GAUGES AND CAN BE FURNISHED AT A SLIGHT EXTRA COST ON ALL OTHER TYPES OF MARSH REFRIGERATION GAUGES AND ON MARSH DIAL THERMOMETERS. ONLY MARSH GAUGES AND THERMOMETERS ARE MADE WITH THIS ZERO ADJUSTMENT.

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FRIEZ PORTABLE RECORDERS

FOR the recording of RELATIVE HUMIDITY, TEMPERATURE, and ELECTRIC RUNNING TIME.

Any combination of functions available. Charts on index file cards with space on back for simultaneous recording of general data. EASILY PORTABLE. (Wt. 52 oz.) VERY COMPACT. (Size 8½" x 5½" x 2¼"). Rugged, sensitive and reliable. An ideal instrument for all concerned with air conditioning, heating ventilating, refrigeration and for many industrial applications. Unique and embodying up to the minute instrument practice at particularly reasonable prices.

Designed and manufactured by THE MAKERS OF AMERICA'S WEATHER INSTRUMENTS.

JULIEN P. FRIEZ & SONS, INC.
(Subsidiary of Bendix Aviation Corporation)
BALTIMORE, MARYLAND



Shorten Every Job with IMPERIAL SERVICE TOOLS

AS the growth of the industry created the need of special tools, Imperial has produced them. Whenever a saving of installation-time became possible, Imperial showed a way.

With the vital changes of the last few years, while details of design grew more complex, engineers and service men have depended more and more on Imperial tools for better joints in shorter time.

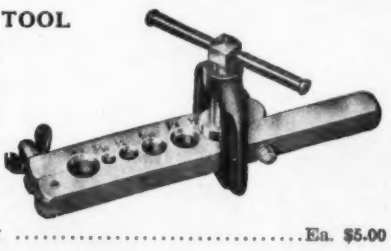
A few popular examples are shown:

IMPERIAL TUBE CUTTER

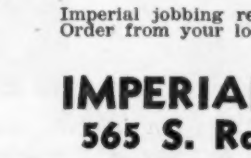
Makes a clean, quick, right-angle cut in copper, brass, steel or aluminum tubing without leaving burrs or chips to clog the line. No chance of flattening tubing, as by using a vise. Has reamer and brass forged body. Excellent for use in hard-to-reach places.
No. 94-F for tubing 3/16" to ⅝" O. D. ..... Ea. $2.50
No. 104-F for tubing 5/16" to 1" O. D. ..... Ea. $3.50

IMPERIAL FLARING TOOL

Flares copper or brass tubing to make S.A.E. joints without cracking or splitting tubing; a good precaution against leakage. There are no loose dies to become lost or mislaid, and no vise is required. Tubing can be clamped, flared and removed in less than 30 seconds.
No. 93-F for 3/16", ¼", 5/16", ⅜", 7/16" and ½" tubing.. Ea. $3.00
No. 95-F for ¼", 5/16", ¾", ½" and ⅝" tubing..... Ea. $4.00
No. 103-F for ¾", ⅞" and 1" tubing ..... Ea. $5.00



IMPERIAL JUNIOR TUBE CUTTER



A smaller-sized cutter, very convenient, and compact enough to fit into the hand. Makes a quick right-angle cut, in much the same manner as No. 94-F and 104-F, with the tubing placed in the V to prevent it from getting out-of-round.
No. 127-F for tubing from 3/16" to ⅝" O. D. ..... Ea. $1.25

IMPERIAL CHARGING AND TESTING UNIT

For charging gas in high and low side, purging air or gas from high side, purging gas from gauge lines, setting expansion valves, controls, etc. Has two wheel-handle valves for opening and closing the various lines, eliminating a wrench. The valves used are the Imperial "Sylpak." Has three ¼" O. D. Connections, 121-C Pressure Gauge and 122-C Compound Gauge.
No. 200-C ..... Ea. $6.75
Less Gauges ..... Ea. $4.85

IMPERIAL CHARGING LINES




To prevent the great danger of breakage during charging, these lines have extra durability against internal pressure and chemical action; also great tensile strength and full flexibility. Made with seamless copper bearing steel core, in circular corrugations. Various lengths, with ¼" female flare fitting on each end.
No. 268-FT Hose, 12" overall....Ea. $1.50
Another type has ¼" male S.A.E. thread connection on each end, to which a copper tube is added complete with forged flare nuts. Copper tubing can be re-flared if worn or broken, or replaced if too short.
No. 271-FT Hose, 24" overall ..... Ea. $2.00

IMPERIAL PINCH-OFF TOOL



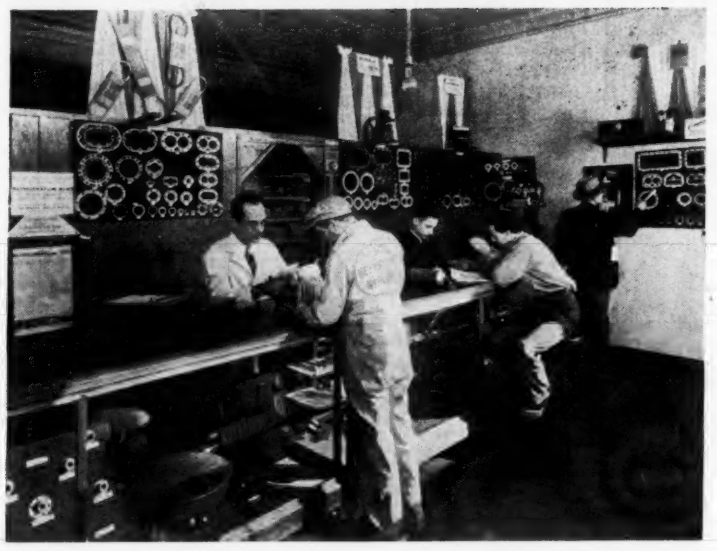
For temporarily closing copper tubing while making repairs. The line can be disconnected without losing any refrigerant. The tool also opens and rounds the tubing back in shape. For ¼", 5/16" and ⅜" tubing.
No. 106-F Pinch-off Tool ..... $1.85
No. 105-F Pinch-off Tool is similar to No. 106-F but has hex head bolts instead of bolts with wing nuts. Does not have extra extension of bar ..... Ea. $1.25

Imperial jobbing representatives are located in all large cities. Order from your local jobbing house. Write also for catalog to

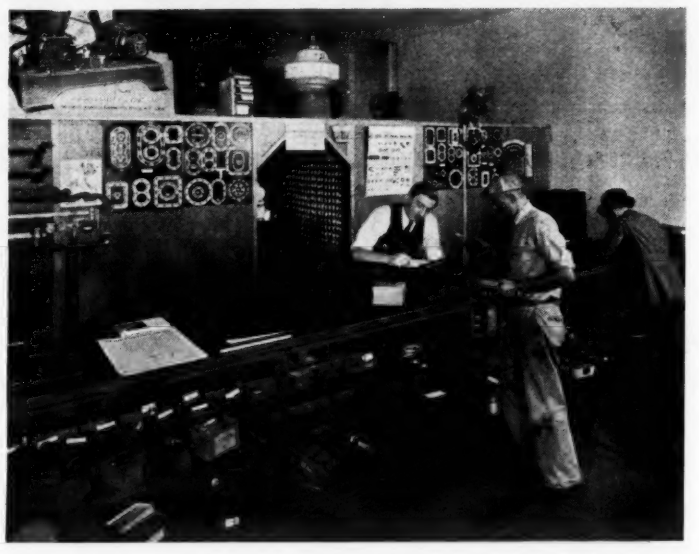
IMPERIAL BRASS MFG. CO.
565 S. Racine Ave., CHICAGO

# Here's What a Refrigeration Supply Jobber's Offices and Stockrooms Look Like

It's an important business—this one of jobbing refrigeration supplies, and these scenes in the Harry Alter Co.'s Chicago and St. Louis stores are typical of what's going on in similar places all over the country. This shows the main supply counter—always a busy spot. Four clerks are on duty.

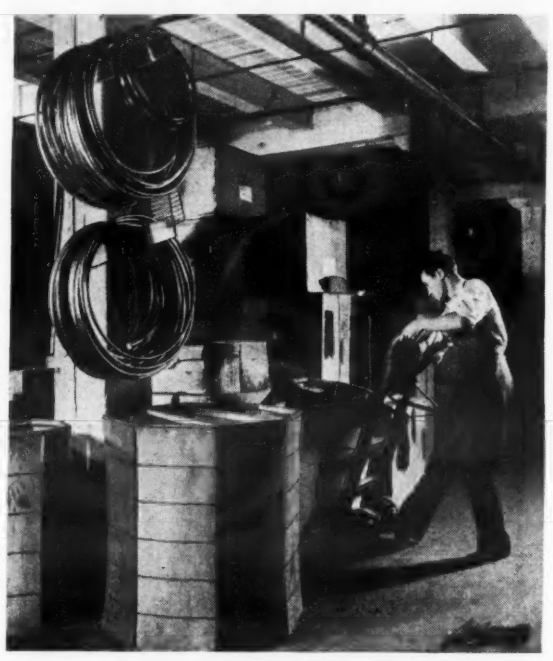


Another view of the main counter. Henry Spivak is selling an evaporator assembly to Mr. Sosher of ABC Refrigerator Repair Co. Farther down the counter, S. Kettner studies the catalog and C. Wolfert picks out some gaskets. The Electric Refrigeration News rack at the left is of Mr. Spivak's own design.



Joe Holub, branch store manager, writes up an order for a cold control which Mr. Foreman of Utilities Refrigeration Co., Oak Park, Ill., has just purchased. Sample copies of the News, with reference volumes, are on the counter, and the man at the far right is studying a 1935 Directory.

Parts, hundreds of them, go into the making of an electric refrigerator. Here's a behind-the-scenes view of the Alter establishment. Stock clerks are checking the company's supply of Imperial valves, fittings, and dehydrators. Tools are in another section.



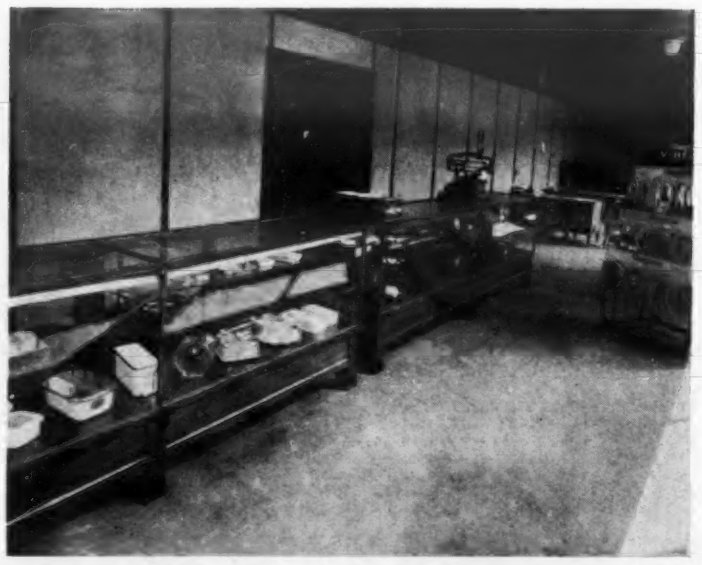
This is a section of the copper tubing stockroom. All manner of this material must be kept on hand to meet the demands of refrigeration service men. The clerk is removing the crate which held the tubing racked in left foreground.

Still another section of the Alter stockroom, this part devoted to V-belt stock, defrosting trays, and replacement gaskets. The clerk at the right is taking down a V-belt, just sold. The defrosting tray stock is shown at the left, and down the aisle (center) is the gasket section.

The Alter Co.'s general office. In the picture: Miss B. Moston, credit manager; George Munser, production manager, order department; Alex Port, adjustment and correspondence; Harry Bernheart and Irving Alter, purchasing department. Arthur Alter, sales manager. N. C. Hurwitz, comptroller.

Here is a view of the West Side store's stockroom. Joe Holub, manager, checks through a part of the stock. Behind him are two drums of sulphur dioxide, while in the front center are supplies of methyl chloride. Copper tubing, gaskets, service tools, and touch-up paint are also in evidence.

A part of every refrigeration parts jobber's store—little known to casual customers, but highly important and usually quite roomy. The shipping and receiving department, where stock comes and goes—in, for display and counter sale; out, to service men and dealers in distant cities.



The store-front counter and part of the display room in the Harry Alter Co. office in St. Louis. B. F. Anthony is manager of the establishment.

A view in the gas room of the St. Louis store. Each store is equipped with special pumps, which protect the operator and keep the refrigerant in the drums dry and clean.

Much of the stock in the St. Louis store is kept in open bins. Here is a section of the stockroom, showing V-belts, gaskets, and fittings. At the right is the order filling table.

# Wile Shows Correct & Incorrect Methods for the Installation Of Thermo Valves

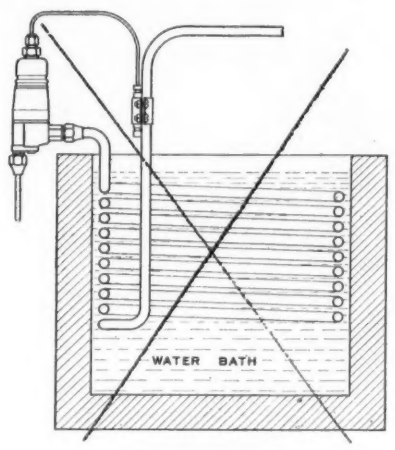
By D. D. Wile, Detroit, Lubricator Co.

EXPERIENCE has shown that the operation of the thermostatic expansion valve can be made much more dependable by observing a few simple rules in its installation.

The following charts show some of the typical installations which can be expected to give trouble, and also the corrected layouts.

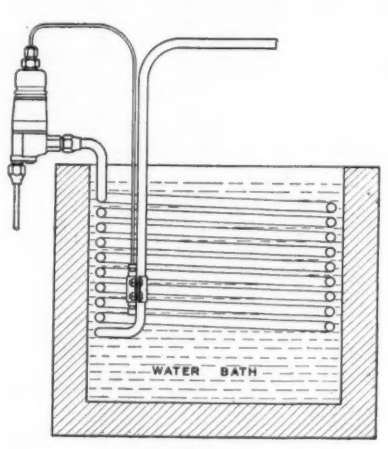
Drawings in which the thermostatic expansion valve has been incorrectly installed are marked through with a cross, and labeled "incorrect." The installations which have been made in the right manner are labeled "correct."

* * *



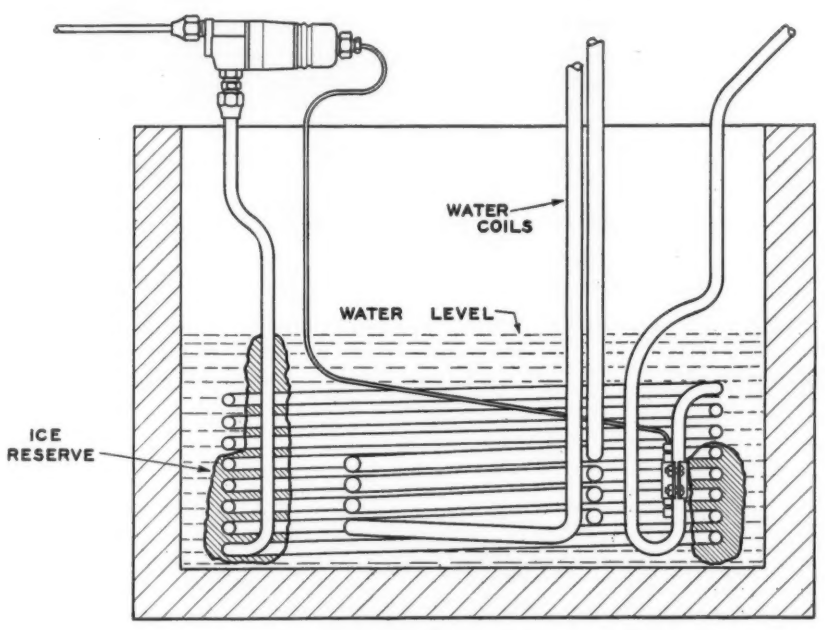

INCORRECT

Fig. 1A—Note that bulb is clamped to suction line outside of the water bath. The bulb is in a much warmer location than the coil and therefore it will warm up too fast, causing trouble same as outlined under Fig. 5.



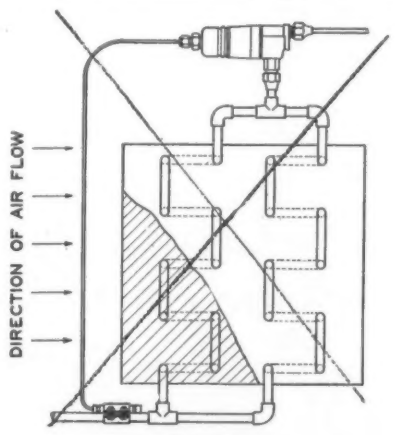

CORRECT

Fig. 1B—Bulb is clamped to tubing below water level. Where it is impossible to clamp bulb a socket made of ½ in. tubing should be soldered to suction line and bulb inserted below level of water.




CORRECT

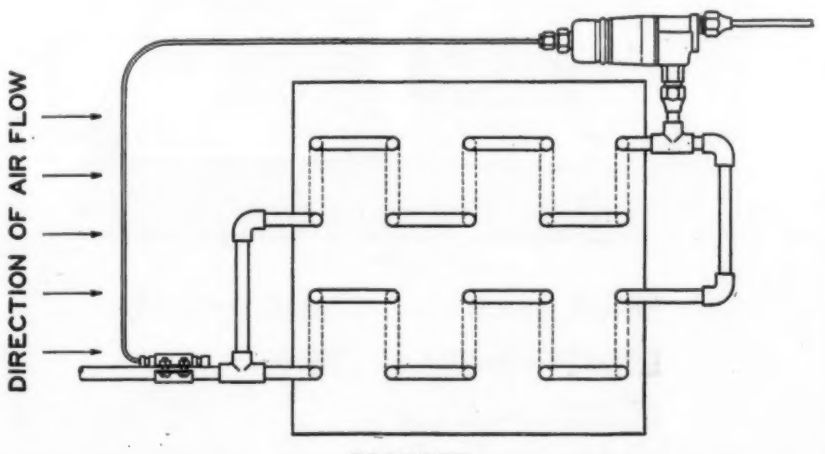
Fig. 1C—Here is another excellent way of solving the water bath problem where it is desired to form ice reserve or obtain temperatures below 39° F. Cold water circulates up instead of down when the temperature is below 39° F. Note that expansion valve feeds into bottom of coil. Suction line is looped downward so that bulb can be clamped in a position where it will limit amount of ice formed. This hook-up works well on wet bottle storage, beer or beverage coils.



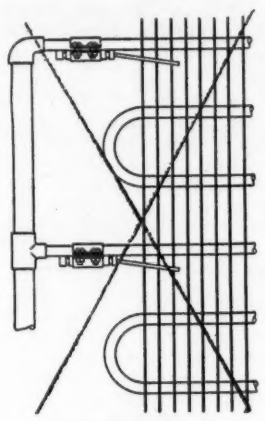

INCORRECT

Fig. 2A (Left)—This air-conditioning coil will give trouble due to a portion of the first coil becoming starved as shown by the shaded area. This first coil is in the path of the warmest air and therefore has a much heavier load than the second coil. If the expansion valve is adjusted to satisfy the first coil the second coil will then flood over.

Fig. 2B (Below)—Note that the two paths through the evaporator are arranged to give counterflow to the incoming air. Each path has the same load and all coils will work evenly.

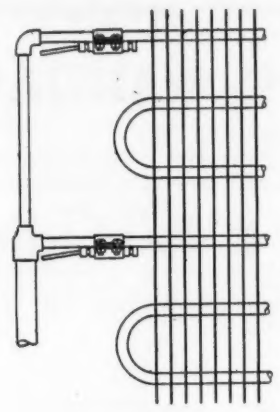



CORRECT



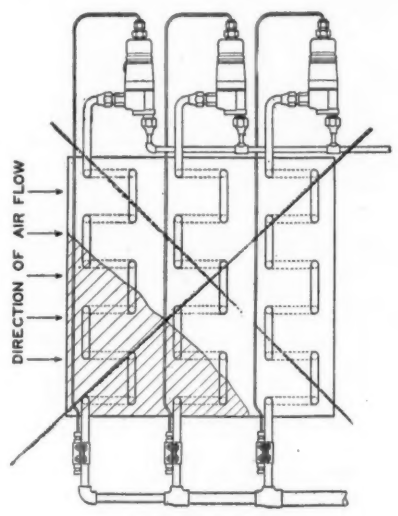
INCORRECT

Fig. 3A—Note that large suction line extends all the way down to the bottom coil. Due to the very slow velocity through the large suction line, oil will trap. This condition may be particularly troublesome on large units involving numerous valves.



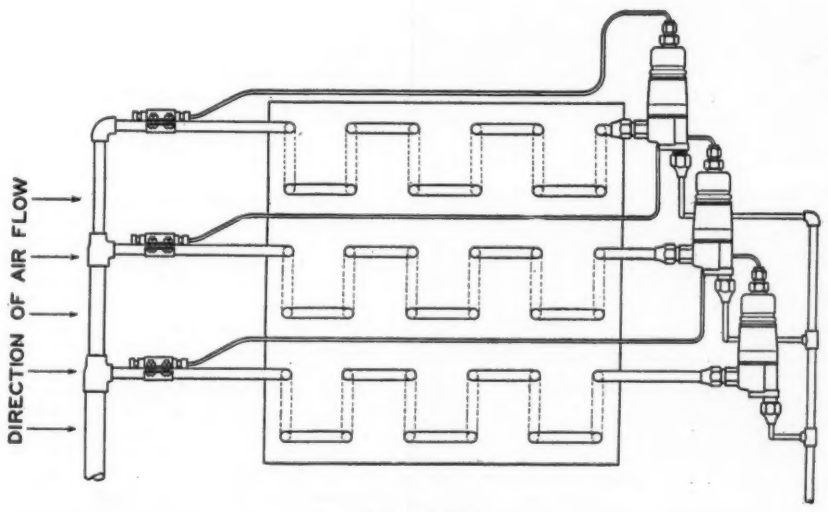
CORRECT

Fig. 3B—Oil trap corrected by using small diameter tubing up to tee. Oil trap can also be eliminated by arranging suction line to bottom of vertical header instead of top.




INCORRECT

Fig. 4A (Left)—First coils in this hook-up must work hardest because they are in the path of the warmest incoming air. Capacity demanded of first valve may be twice as great as on last valve. First coils may starve as shown by shaded area due to large capacity demand on valve and large pressure drop through tube. This hook-up may also give trouble due to short connection between thermostatic bulbs and suction line. If one coil should flood over slightly it will affect the thermostatic bulbs on the other coils. Remember copper is an excellent conductor of heat.




CORRECT

Fig. 4B (Above)—Unequal loading corrected by connecting valves so that each one has equal load. Note that suction lines are made longer to eliminate conduction from one bulb to another. By providing the extra length of tubing between the thermostatic bulb and the suction line each bulb can work independently so as to accurately control each coil without interference from the others.

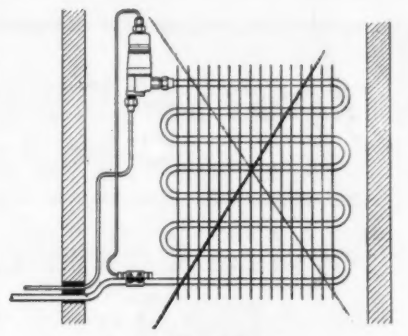
## Safety Council Speaker Warns about Wiring

LOUISVILLE, Ky.—Exposure to dampness, low temperatures, and salt and brine-laden air subjects electrical equipment to abnormal deterioration, and unless it is guarded carefully and inspected periodically, operating hazards are greatly increased, F. G. Schoenfeld told delegates at the Annual Safety Congress here last week.

In guarding power and light wires, all-metal conduit of the hot galvanized steel type has been found particularly resistant to corrosion, Mr. Schoenfeld said. In cases where the possibility of corrosion is particularly bad, aluminum conduit is used, but because of its high cost such use cannot be very extensive.

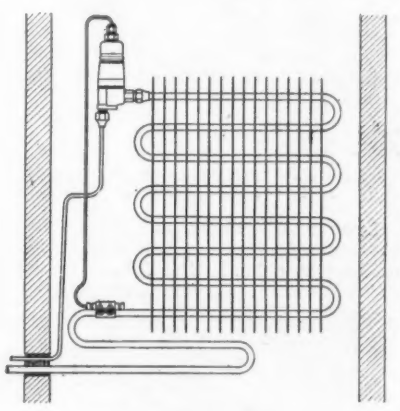
Before installation, said the speaker, all-metal conduit lines are given a protective coat of good paint, and this operation is repeated at regular intervals during life of the conduit.

Mr. Schoenfeld recommended for power and light lines rubber-covered wire of the 30 per cent insulation type in preference to the so-called code or 20 per cent insulation wire. Wiring in the interior of coolers and in other extremely wet locations should be of the open type installation, laid in a protecting wooden trough.



INCORRECT

Fig. 5A—Note that there is only a short length of suction line between thermostatic bulb and wall of refrigerator. During the shut-down period heat flows in through the suction line and warms up the bulb. This causes the valve to open during the shut-down period. Trouble occurs at start of each cycle when compressor sucks excess liquid out of coil. Suction line usually frosts or sweats at start of cycle and compressor may knock due to refrigerant in crankcase. Unit may short cycle.



CORRECT

Fig. 5B—Suction line is looped to provide additional length between bulb and outlet through refrigerator wall. This loop does not have to be under the coil. It can be placed upright at end of coil if desired.

## CORRECTION

### *Reference to Models Not Clear in Valve Article*

In the article by H. B. McLaughlin, chief engineer, Temprite Products Corp., in the Oct. 16 issue under the heading "Control Valves Developed for Larger Compressors & Better Temperature Selection," the valve referred to in the sixth paragraph from the end of the article as having a range between 26 lbs. pressure and 15 in. of vacuum is the Temprite model 700 valve, while the valve referred to in the last paragraph of the article is the model 500 valve.

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# MASTER SERVICE MANUAL

*Chapter 9—Service*

# Service Complaints & Remedies On Type 1A Systems

By K. M. Newcum

Type 1, flooded system, using the low side float valve will be divided into the following classifications in consideration of service complaints:

Type 1A: Flooded system, using the low side float valve, low pressure control, and having two evaporator service valves, valves No. 4 and No. 5, as shown in Fig. 135.

Type 1B: Flooded system, using the low side float valve, low pressure control, and the evaporator *not equipped* with shut-off service valves No. 4 and No. 5. Fig. 136.

Type 1C: Flooded system, using low side float valve, thermostatic control, and having two evaporator service valves, valves No. 4 and No. 5. Fig. 137.

Type 1D: Flooded system, using low side float valve, thermostatic control, and the evaporator *not equipped* with shut-off service valves No. 4 and No. 5, Fig. 138.

## 77. Complaints on Type "1A" Flooded Systems

Proper diagnosis of service complaints will reduce the actual work on service calls. In the following, many of the actual service complaints, on Type "1A" system (Fig. 135) are given just as they are received from the user. Each complaint will be given a brief diagnosis to help to determine the actual cause of the trouble and possible means of correcting the difficulty.

### Complaint No. 1: Compressor Does Not Run Much: Evaporator Is Defrosting

It is apparent that there is a lack of refrigeration and as the amount of refrigeration depends upon the amount of liquid refrigerant that is evaporated, it is thus determined that an insufficient amount of evaporation is taking place.

It is not probable that there is a shortage of refrigerant in the system for by referring to paragraph 64, Chapter 5, we find that a shortage of refrigerant in a low side float system will result in the float remaining open and allowing the high pressure gas to enter the low pressure side. This higher pressure would effect the low pressure control and keep the system operating excessively or continuously.

As the amount of refrigerant evaporated depends primarily upon the amount of time the compressor runs, a check should be made to determine why the compresor does not run more.

From a study of the refrigerant circuit and the cycle of operation in the Type "1A" system (Fig. 135), it can be seen that as long as the low pressure control is set for the proper cutting-out and cutting-in points the compressor should operate sufficiently, providing the refrigerant circuit is not interrupted or restricted.

The control setting should be checked first. If it is correct all service shut-off valves should be checked to make sure that they are fully opened and are not restricting normal circulation.

The liquid line filter at the liquid receiver should then be checked. If it is partially clogged, the line beyond it will be cool or cold, as it will be acting as a liquid throttle valve. If it is completely clogged there will be liquid up to the filter, but not beyond. In this case it should be cleaned or replaced.

If the first filter is clean, the second one in the circuit just outside valve No. 4 should be checked in the same manner as the first, and cleaned or replaced if found clogged.

In some systems there is still another strainer between valve No. 4 and the float valve needle and seat, see Fig. 86, chapter 5. If this strainer is clogged there will be liquid up to this point, but not beyond.

There is a remote possibility that the float valve may be stuck shut. This condition is generally confined to $SO_2$ systems that have a large amount of moisture, causing corrosion. In this case the liquid refrigerant will be up to the needle and seat but not beyond.

With refrigerants such as methyl chloride, Freon, and Isobutane, a small amount of moisture circulating with the liquid may freeze at the float needle and seat, restricting or stopping the inflow to the float chamber. This moisture should be removed by installing a dehydrator in the liquid line.

Any one or a combination of one or more of the above conditions, by restricting or stopping the flow of refrigerant to the evaporator, will result in the pressure in the low side being reduced to the cutting-out point of the low pressure control very rapidly, and without allowing the compressor to operate long enough to evaporate a sufficient quantity of refrigerant while it is running to reduce the refrigerator temperature and keep the evaporator frosted.

### Complaint No. 2: Compressor Runs Continuously but Ice Does Not Freeze

This complaint shows that there is insufficient evaporation even though the compressor is operating continuously. The fact that the operation is continuous suggests that there is no restriction in the refrigerant circuit.

Most common cause of such a complaint is a shortage of refrigerant. This may be checked by installing the gauges and noting the pressures during the running period. The low side pressure is generally high and the high side pressure lower than normal.

By stopping the compressor and checking the pressures it may be noticed that they tend to equalize, which shows a break between the high and low side. A hissing noise at the float valve will also accompany a shortage of refrigerant.

If the system is short of refrigerant more should be added until the hissing noise ceases, the pressures return to normal and the evaporator starts to frost.

If there is a hissing noise at the float and the pressure tends to equalize on the off cycle and the suction line is cold or frosted, the float valve is holding open or leaking. The frosted or cold suction proves that there is no shortage of refrigerant. The float should first be flushed, and if flushing does not reseat the valve, it must be replaced.

If neither of the above conditions are found and the compressor still runs continuously, but does not freeze ice cubes, the discharge valve may be leaking to a point where the compressor has become very inefficient.

This may be determined by closing valve No. 1 and noting the pressure. If the discharge valve is leaking the low side pressure will steadily increase to finally equalize with the high side pressure.

It may also be that the piston or suction valve is broken or very badly worn, reducing the efficiency of the compressor. This may be tested by operating the compressor with valve No. 1 closed. The compressor should draw around a 25 lb. vacuum.

If the vacuum is much above this point on the compound gauge with valve No. 1 closed and the compressor operating the piston valve should be inspected, and either repaired or replaced.

An oil-logged evaporator such as described on page 79 (INTRODUCTION TO THE MASTER SERVICE MANUAL, Chapter 5) may cause excessive or continuous operation and slow up freezing of ice cubes.

High head pressure will cause long or continuous operation by materially

*(Continued on Page 17, Column 3)*

## First 6 Chapters of Master Service Manual Now Available in 112-page Booklet

Published in this issue is Chapter 9, Instalment 2 ("Service of Refrigerators") of the Master Service Manual, prepared by K. M. Newcum. The manual is being published serially in Electric Refrigeration News, the first instalment appearing in the April 10, 1935, issue. When all the chapters have been published in the News, the information will be put in book form, with considerable supplementary material.

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Following is an outline of the subjects and the dates of the weekly issues of Electric Refrigeration News in which the material was published:

Chapter 1—THEORY OF REFRIGERATION (April 10).
Chapter 2—PRINCIPLES OF MECHANICAL REFRIGERATION (April 17).
Chapter 3—COMMON REFRIGERANTS (April 24).
Chapter 4—CONDENSING UNITS.
Instalment 1: description of various compressor parts (May 1).
Instalment 2: stuffing box seals, flywheels, and direct-connected units (May 8).
Instalment 3: rotary compressors (May 29).
Instalment 4: care and servicing of shut-off valves and gaskets (June 5).
Instalment 5: condensers (June 12).
Instalment 6: liquid receivers (June 19).
Chapter 5—EVAPORATORS.
Instalment 1: flooded evaporators with low side float valve (June 26).
Instalment 2: high side float valves and flooded evaporators (July 3).
Instalment 3: automatic expansion valves (July 10).
Instalment 4: automatic expansion valves —continued (July 17).
Instalment 5: thermostatic expansion valves (July 24).
Chapter 6—CONTROLS.
Instalment 1: low pressure controls (July 31).
Instalment 2: low pressure controls—continued (Aug. 7).
Instalment 3: thermostatic controls (Aug. 14).
Instalment 4: thermostatic controls—continued (Aug. 21).
Chapter 7—MOTORS.
Instalment 1: repulsion start-induction run motors (Aug. 28).
Instalment 2: repulsion start-induction run motors (continued) and capacitor motors (Sept. 4).
Instalment 3: direct current motors and belts (Sept. 11).
Chapter 8—INSTALLATION
Instalment 1: installation of refrigerators (Sept. 18).
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Chapter 9—SERVICE.
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## Flooded Systems Equipped with Low Pressure Control

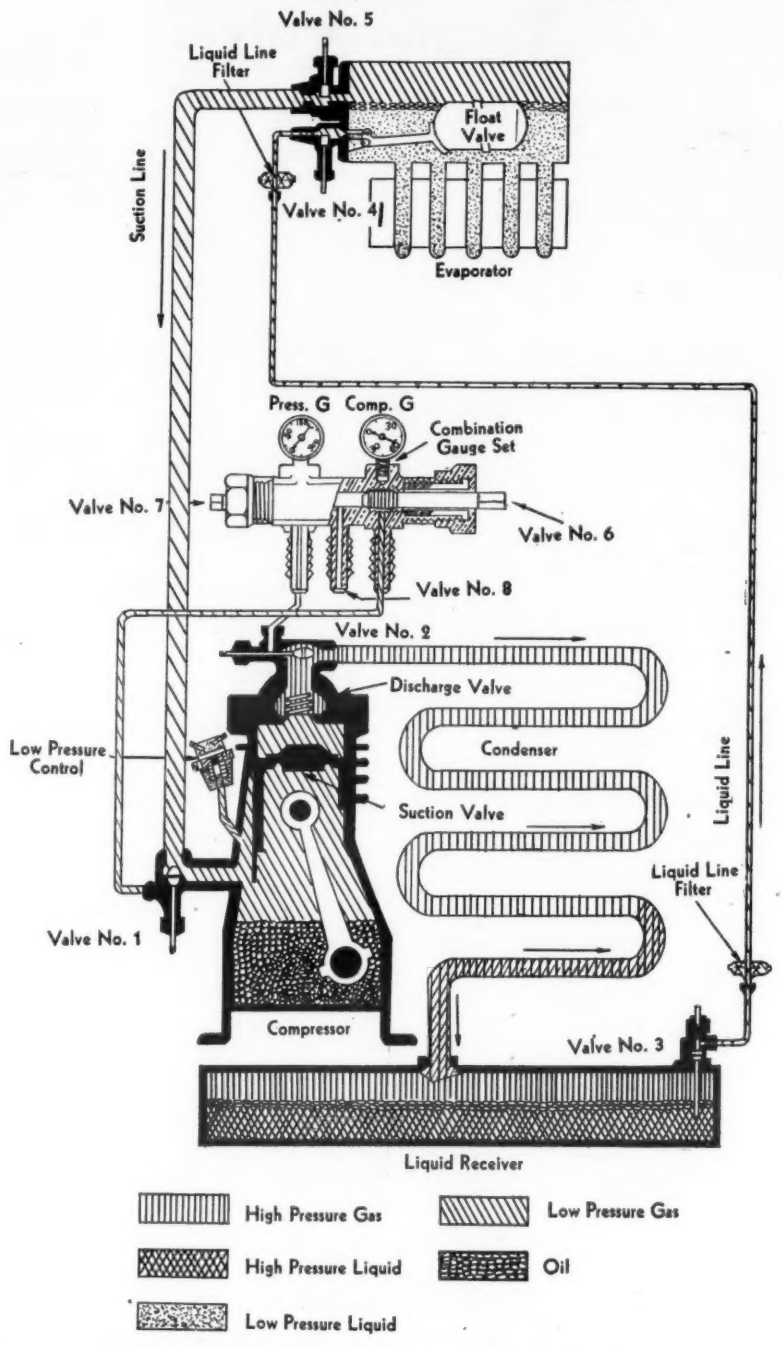


Fig. 135—Type 1A flooded system using low side float valve, low pressure control, and having two evaporator service valves (No. 4 and No. 5. Common service complaints and remedies for this system are described in this issue.

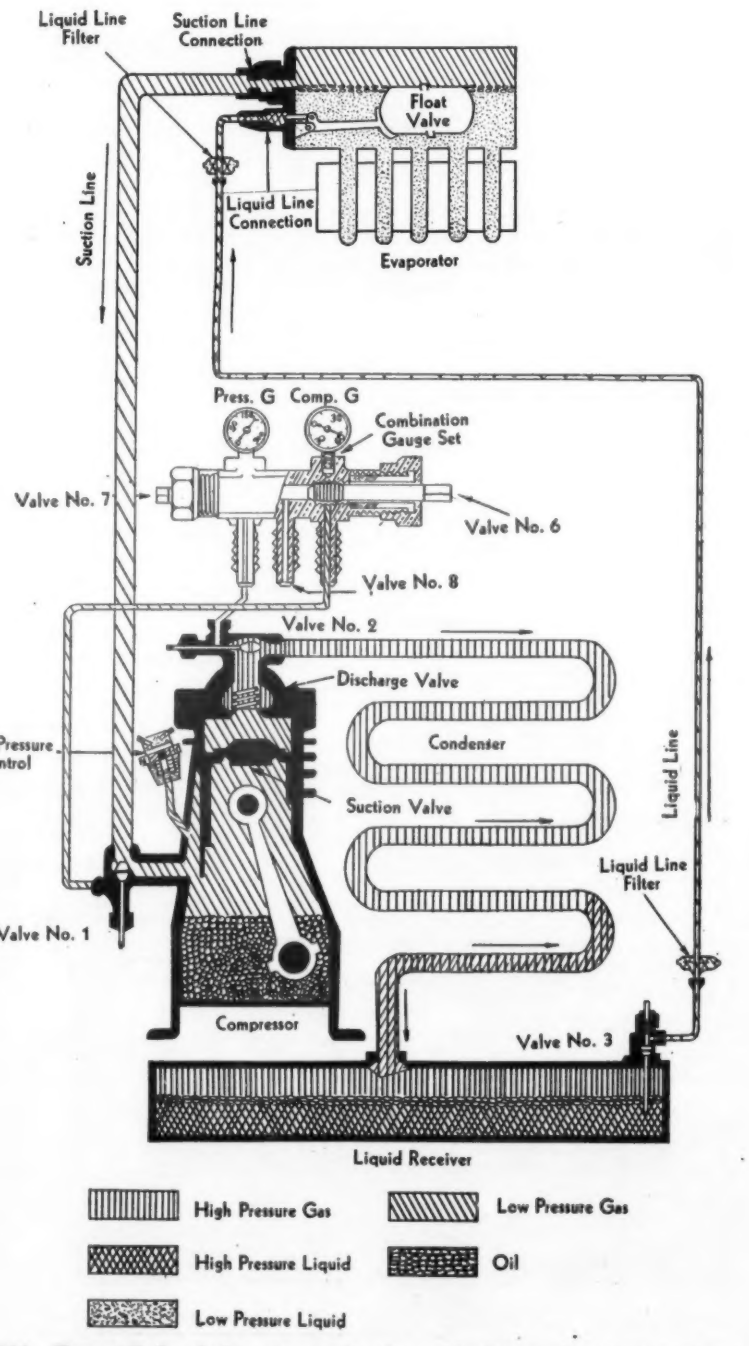


Fig. 136—Type 1B flooded system using low side float valve, low pressure control, and the evaporator is not equipped with evaporator service valves.

# Flooded Systems Equipped with Thermostatic Controls

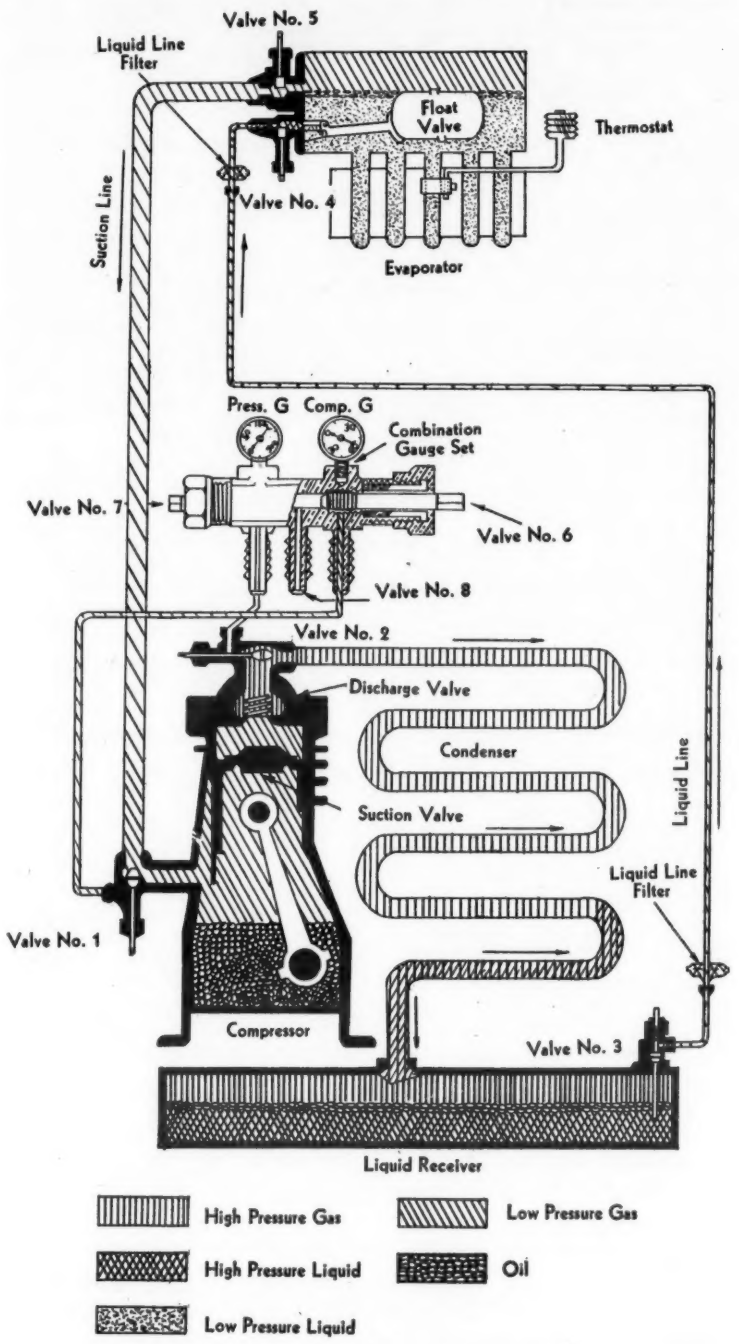


**Fig. 137—Type 1C flooded system using low side float valves, thermostatic control, and having two evaporator service valves No. 4 and No. 5. Service information on these systems will be covered in later instalments.**

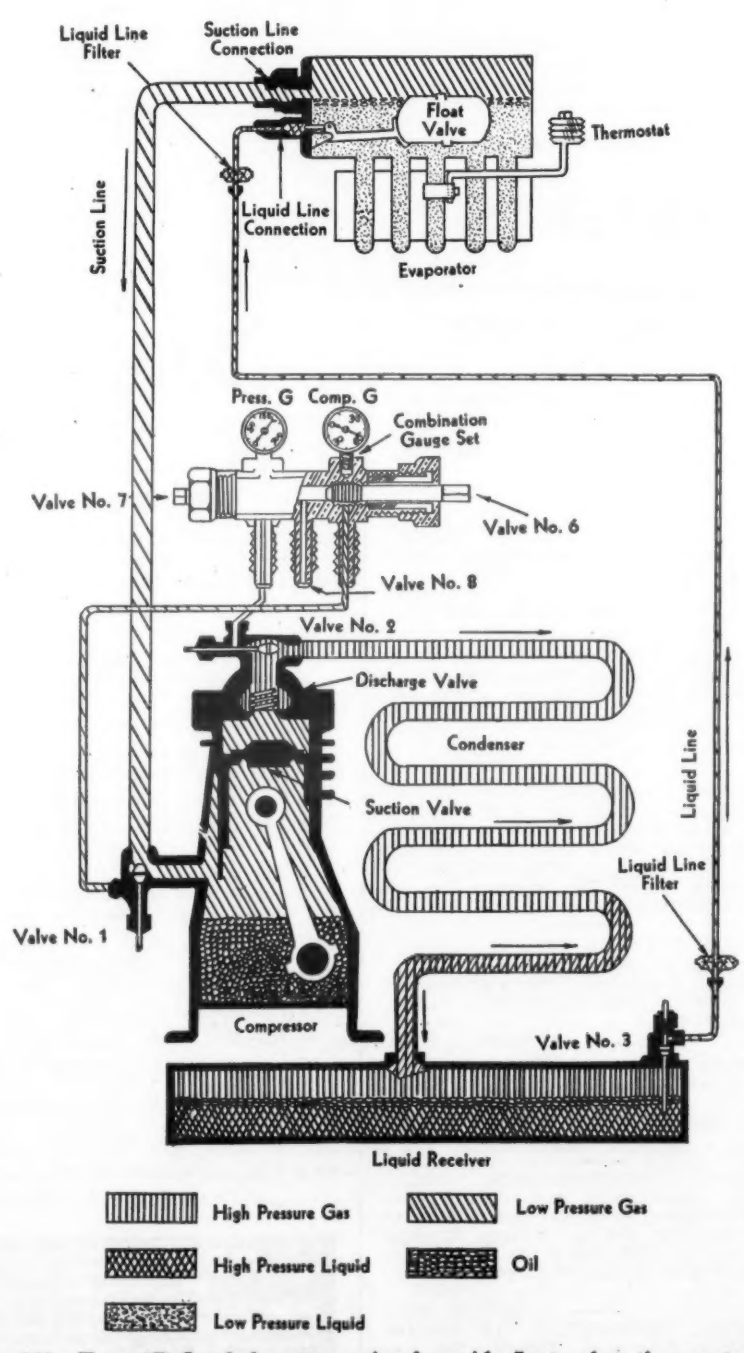


**Fig. 138—Type 1D flooded system using low side float valve, thermostatic control, and having the evaporator not equipped with service valves.**

# Service Complaints & Remedies for Type 1A Flooded Systems

(*Continued from Page 16, Column 3*)

reducing the displacement capacity of the compressor.

**Complaint No. 3: Trays or Metal Parts Inside of Refrigerator Tarnished**

One of the most common causes of this complaint is a slight $SO_2$ leak inside the refrigerator which may not have been detected as an odor.

Before cleaning or replacing the damaged parts the complete system should be tested for small leaks. It is necessary to build up a higher than normal low side pressure for testing. This may be done by opening valve No. 7 on the combination gauge set, and using valve No. 6 as a throttle valve allowing the high pressure to pass over into the lowside to build the pressure up to 35 lbs., then close valves Nos. 7 and 6 and test for leaks as given under refrigerants in Chapter 3.

Some trays are plated and cleaning with an abrasive material may remove the plating causing them to discolor.

It is always advisable to remove the trays and other contents of the refrigerator when making repairs in the refrigerator such as changing the float valve, for oil containing refrigerant may get on the trays and other parts causing them to tarnish.

**Complaint No. 4: Costs Too Much to Operate**

This complaint may be due to the control being set "too cold," resulting in a lower than necessary refrigerator temperature.

The user may also have been misinformed as to the actual cost of operating the refrigerator.

High head pressure decreases the efficiency of the compresor and results in increased running time. Install both gauges and check the head pressure. High head pressure may be from two main causes—air in the top of the condenser and an overcharge of refrigerant.

Poor air circulation to the condenser or a dirty condenser also causes high head pressure and increases the current consumption.

A shortage of oil in the crankcase may cause the compressor to run "stiff" and increase the current consumption. Most domestic compressors do not have an oil level gauge or plug. If the compressor is stiff from lack of oil it will usually squeak or knock and will not coast and turn freely when it stops.

This condition may be determined by adding a small quantity, say one-fourth pint, of oil to the compressor and noting any improvement.

All other causes of increased operating time given in Complaint No. 2 should be checked.

**Complaint No. 5: Compressor Noisy**

Check for small parts, bolts, tubing, etc. that may have worked loose and are rattling. Check the belt for alignment, and see that it is free from foreign material. Check the motor for noise, both on starting and running. The brush holder assembly may need adjusting or replacing. The motor may have excessive end play.

Check the motor pulley set screw key and flywheel retainer nut. If they are tight, turn the flywheel back and forth and note any looseness in the compressor parts.

In any event, both gauges should be installed and the pressures noted. High head pressure will impose and overload on both the compressor and motor, and might bring out knocks and noises that would not be noticed under normal operating head pressures.

Too much oil in the crankcase will cause the compressor to knock, as the excessive oil will be scrubbed through the discharge valve causing it to open wider than for gas, and this will set up a loud, sharp knock. This oil knock will be noticed at irregular intervals, and especially on starting.

There is also a possibility where lead gaskets are used between the discharge valve plate and the cylinder, that they have been compressed by the tightening of the head bolts to a point where the top of the piston touches the valve plate. This may be corrected by installing an extra gasket at this point.

A shortage of oil in the crankcase will cause the compressor to run noisy.

Certain types of stuffing box seals set up a loud squeaking noise. This condition is described under Stuffing Box Seals, paragraph No. 55, Chapter 4.

**Complaint No. 6: Ice Freezes but Food Spoils**

The spoiling of food would indicate a high refrigeration temperature.

Check causes given in complaints No. 1 and No. 2 for high refrigerator temperatures. If the system is functioning correctly and the control is

(*Concluded on Page 18, Column 3*)


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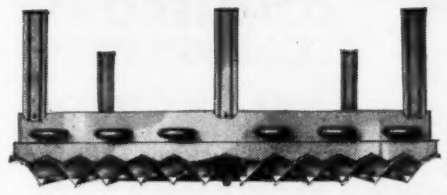

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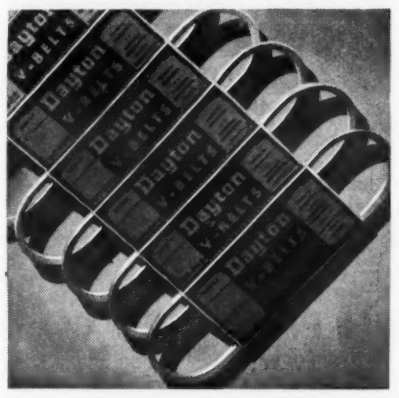

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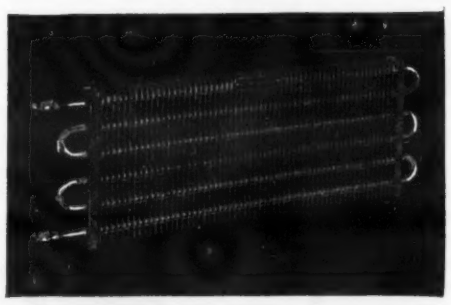

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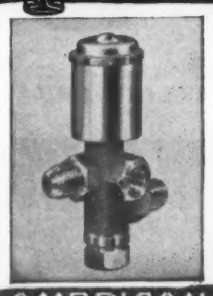

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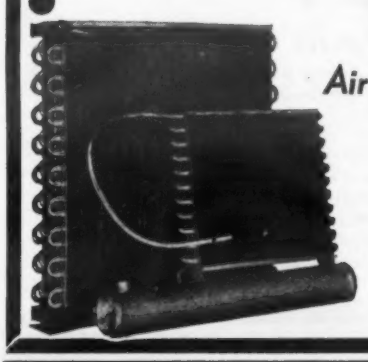

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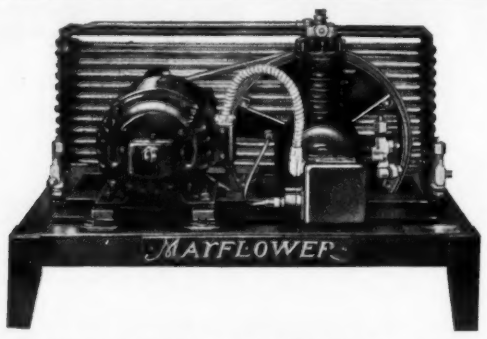


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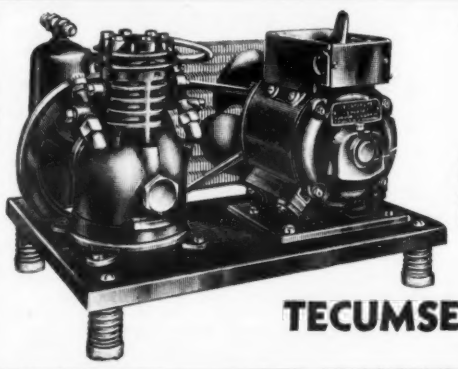

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## Typical Complaints On Type 1A Systems

(*Concluded from Page 17, Column 3*)

set properly, check the frost and ice accumulation on the evaporator.

If the evaporator is heavily coated with frost or ice, the heat from the food compartment is being insulated from the evaporator and refrigerant, resulting in spoilage. This frost and ice may also close or restrict air passages necessary for proper air circulation.

Instruct the user to defrost completely at regular intervals. In the average home where the refrigerator is being used for every meal, the unit should be defrosted once each week.

Examine the methods of placing the foods in the refrigerator. They may be placed in such a way as to restrict air circulation. Free circulation in all parts of the refrigerator is necessary, if all parts are to be maintained at below 50° F., which is considered a maximum temperature for the proper preservation of food stuffs.

**Complaint No. 7: Food Has Peculiar Taste**

Refer to Complaint No. 3, as the same condition that might cause trays to tarnish, may cause food to taint.

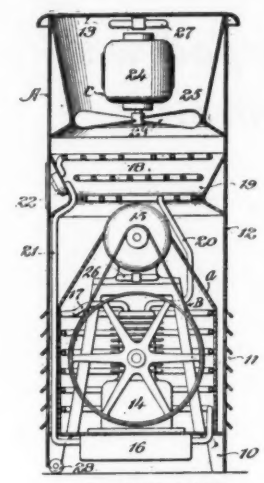
If lemons, onions, and other highly odorous foods that are readily absorbed by other food products, are placed in the path of circulation or below the evaporator, their odors may be carried to the other foods. Such foods should be placed at the top of the refrigerator and as near the evaporator as possible, so that their odors will be immediately absorbed and deposited on the evaporator.

Check the refrigerator temperature, to make sure that all parts of the refrigerator are below 50° F.

In some types of cabinets, such as old ice boxes, which might leak into the food compartment. through cracks, etc. These cracks should be sealed with an odorless putty.

All openings, such as where the tubing enters the refrigerator, should be completely sealed with hot Hydrolene.

Interior of the cabinet and the evaporator should be thoroughly cleaned with a strong solution of lukewarm water and baking soda.



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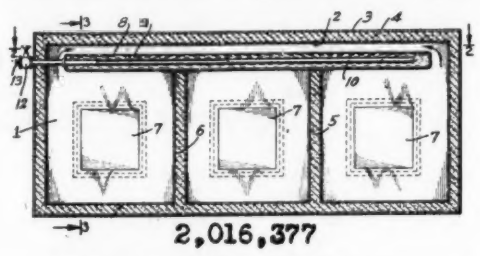

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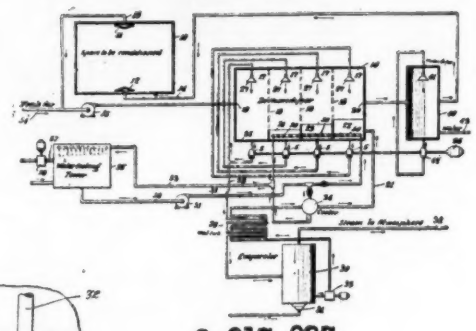
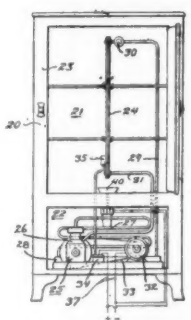


2,017,027



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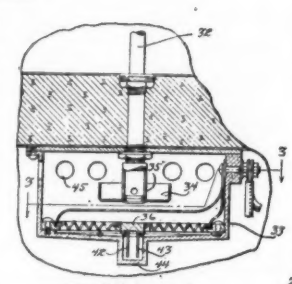

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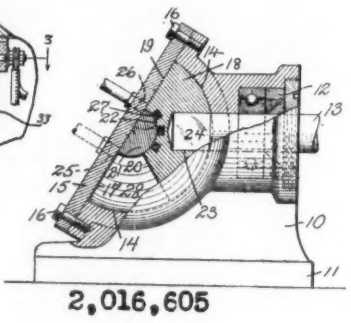

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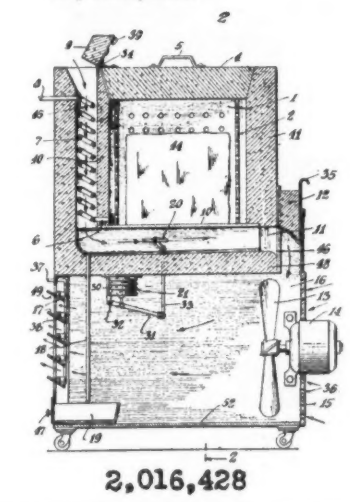

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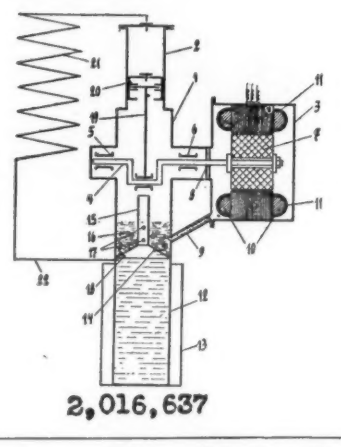

2,016,637

## BOOKS

### *Modern Diesel Engine Practice*

Author: Orville Adams, Consulting Diesel Engineer. Publisher: The Norman W. Henley Publishing Co. Pages: 650. Price: $6.00.

The possibility of using Diesel engines in air conditioning has led to inquiries to ELECTRIC REFRIGERATION NEWS for the latest book on modern Diesel engines. One of the most complete textbooks on the subject, *Modern Diesel Engine Practice* is recommended. It is illustrated with 400 engravings.

As a result of specialized research, practical Diesel information never before published is included in this book, which was written with the purpose of combining in one volume a text for study and reference—and a practical manual on operation and repair.

Fundamental basic facts requisite to Diesel engine theory and operation, as well as rules for maintenance are found in this book, arranged in a logical order, and written in language for the practical man.

An interesting feature of the volume is a full description of the modern Packard Diesel aircraft engine.

The book is divided into seven main divisions, namely, operation, application, maintenance, engineering, aviation, locomotive, and automotive.

Chapters I and II deal with evolution, history, introduction, and general considerations.

The following four chapters are devoted to general, technical, stationary, and mobile applications of modern Diesel engine practice. Chapters VII, VIII, and IX deal with general operation, solid injection operation, air injection operation, and operating practice.

Under the general classification of maintenance, Chapters X, XIII, XIV, and XV discuss maintenance-practice, efficient lubrication, piston ring efficiency, and repair maintenance.

With regard to the engineering division of the book, the author discusses engineering the Diesel plant, auxiliaries-installation, plant layout and design, standards-regulations, and erection-testing.

Chapters XVI and XVII are devoted to aviation applications, Diesel aircraft engines, and aircraft engine operation. With regard to the application of Diesel engines to the locomotive field, Mr. Adams describes the Diesel locomotive, Diesel locomotive design, and operation-application.

The concluding chapter discusses the possibilities for Diesels for mobile, marine, and automotive applications, including truck, tractor, bus, automobile, and racing car.

From the above condensed index of this book on modern Diesel engine practice, it may be seen that the book covers all types of Diesel engines, their operating principles, and numerous commercial automotive, and industrial applications.

The volume also gives methods of installation operating costs, types best suited for various tasks, and rules for repair and maintenance.

## PATENTS

### *Issued Oct. 8, 1935*

2,016,327. REFRIGERATING APPARATUS. Leonard Green, Philadelphia, Pa., assignor, by mesne assignments, to General Motors Corp., a corporation of Delaware. Application July 7, 1933. Serial No. 679,284. 21 Claims. (Cl. 62—2.)

2,016,368. REFRIGERATING APPARATUS. Richard S. Gaugler, Dayton, Ohio, assignor, by mesne assignments, to General Motors Corp., a corporation of Delaware. Application May 26, 1933. Serial No. 672,916. 16 Claims. (Cl. 62—103.)

2,016,377. REFRIGERATED VEHICLE. Henry Wiley Krotzer, Pleasantville, N. Y., assignor to The Borden Co., New York, N. Y., a corporation of New Jersey. Application July 11, 1932. Serial No. 621,818. 5 Claims. (Cl. 62—95.)

2,016,422. HEAT EXCHANGE APPARATUS. James S. Frazer, Earlville, Md., assignor, by mesne assignments, to York Ice Machinery Corp., York, Pa., a corporation of Delaware. Application Nov. 5, 1931. Serial No. 573,205. Renewed May 20, 1933. 14 Claims. (Cl. 62—129.)

2,016,428. UNIT AIR COOLER. Rudolph L. Hasche, Milwaukee, and Austin Gudmundsen, Wauwatosa, Wis. Application May 24, 1932. Serial No. 613,192. 6 Claims. (Cl. 92—91.5.)

2,016,605. PUMP, COMPRESSOR AND THE LIKE. James L. Kempthorne, Montclair, N. J. Application Feb. 24, 1932. Serial No. 594,789. 8 Claims. (Cl. 103—142.)

2,016,637. REFRIGERATOR. Willy Hirche, Leopoldshain, near Gorlitz, Germany, assignor, by mesne assignments, to E. Rothenberg, Berlin, Germany. Application May 2, 1932. Serial No. 608,750. In Germany Jan. 2, 1930. 16 Claims. (Cl. 62—115.)

2,017,027. METHOD OF AIR CONDITIONING. Henry O. Forrest, Teaneck, N. J. Application Aug. 19, 1931. Serial No. 557,959. 2 Claims. (Cl. 261—11.)

## Rotary Pipe-Hole Saw Developed by Starbuck

HARTFORD, Conn.—A rotary pipe-hole saw has been developed by R. M. Starbuck & Sons for the single purpose of cutting holes for pipes through wooden floors, ceilings, and partitions.

This pipe-hole saw, its manufacturers claim, will cut through nails without injury to the tool; also through metal ceilings.

The tool operates successfully chiefly because of the long flutes in the cutters, which provide escape for sawdust as fast as it accumulates. Without this feature, sawdust would pipe up on top of the teeth, and stop its cutting.

The cutters or saws are of sufficient depth to go through three thicknesses of flooring. They may be re-sharpened with a file.


☆ ☆ ☆ ☆ ☆ ☆

**Artic**

REG. U. S. PAT. OFF.

(DU PONT METHYL CHLORIDE)

**THE ALL-STAR REFRIGERANT**

*for*

**DOMESTIC, COMMERCIAL UNITS**

1 Small volume displacement per unit of refrigeration, permitting the use of small, compact equipment.
2 Not corrosive to ordinary equipment.
3 Operates at positive pressures, even at sub-zero temperatures.
4 Fast cooling and quick freezing.
5 Gives controlled low temperatures easily and efficiently.
6 Thermally stable and does not decompose at any temperature existing in the refrigeration system.
7 Has low head pressures, adaptable to air-cooled condensers and lightweight equipment.
8 Economical of power.
9 Handled, serviced with ease.
10 Easy to "hold"—comparatively low leakage.
11 Easy to engineer—no unusual design problems.

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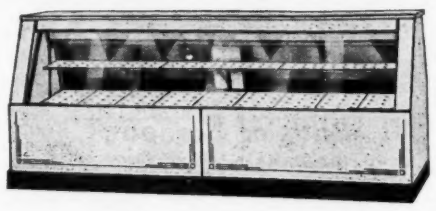
The R. & H. Chemicals Dept.
Wilmington, Del.
District Sales Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco

**"DRY-KOLD", *A COMPLETE LINE!***



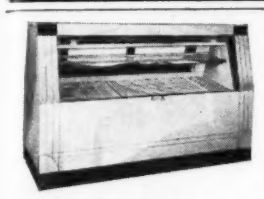
Refrigerator Display Cases
Meat Coolers Fish Cases
Complete Market Equipment

Refrigerators for Hotels, Restaurants, Florists, Delicatessens

*Furnished with coils or without*

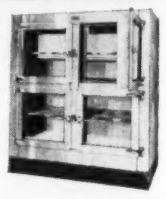
Territory open for good dealers

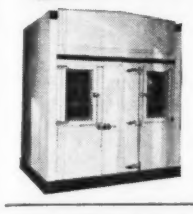
The "DRY-KOLD" REFRIGERATOR CO., Niles, Michigan



**KOCH COMMERCIAL REFRIGERATOR CABINETS**

Whether it's a display case, a reach-in refrigerator, a walk-in cooler, or some special, made to order job. KOCH Equipment is consistently constructed to the same high standards. Frame, insulation, porcelain exterior—every part is accurately fabricated for perfect performance.





**WANTED**
**DISTRIBUTORS AND SALES AGENTS**

Attractive sales proposition. Some good territories available. Many exclusive features. Write for information, and submit your qualifications.

**KOCH REFRIGERATORS**
North Kansas City, Mo.

**TYLER'S NEW WELDED STEEL REFRIGERATOR CASES**

At last a general purpose case at a sensible price. Offers every advantage of the most costly cases at tremendous savings. Modern in every detail. Comes equipped with coils. Single and double duty models.

**AN AMAZING VALUE**

Hundreds in use. Every store and market a prospect. Home Equipment Company, Fort Wayne, Ind., sold nine cases in two weeks. Write or wire for all the facts.

TYLER *Sales Fixture* CO., Dept. E, Niles, Michigan

3 INCH INSULATION-TRIPLE GLASS

**REFRIGERATION PARTS**
**Domestic--Commercial--Air Conditioning**

100% WHOLESALE "We Protect the Dealer"

You can always depend on us for lowest prices and speedy service. Our big catalog showing **America's largest line** free to all legitimate dealers and service companies. Write today on your letterhead.

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Main Office and Warehouse
1728 So. Michigan Ave., CHICAGO, ILL., U.S.A.

*Everything Needed* **PARTS-SUPPLIES-TOOLS**

FOR SERVICING *and* INSTALLING ALL MAKES OF REFRIGERATION EQUIPMENT

We have what you need for repairing and installing all types of domestic and commercial refrigeration equipment. Our stock is complete. Our service is speedy and accurate. We are as near you as your telephone. Send business card or letterhead for our elaborate Free catalog.

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IMMEDIATE SERVICE

AIRO SUPPLY COMPANY
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## Master Service Manual Order

Date.....

BUSINESS NEWS PUBLISHING CO.
5229 Cass Ave., Detroit, Mich.

☐ Please enter my advance order for the MASTER SERVICE MANUAL, and send me reprints (in pamphlet form) of the first six chapters as published in the weekly issues of Electric Refrigeration News from April 10 to Aug. 21, 1935. Enclosed is $3.00.

☐ Please enter my subscription to ELECTRIC REFRIGERATION NEWS to start with the issue of Aug. 28, 1935, and send me reprints (in pamphlet form) of the first six chapters of the MASTER SERVICE MANUAL as published in previous issues of the NEWS. Enclosed is $3.00. I understand that this does NOT entitle me to the complete book or reprints of future chapters to appear in the NEWS.

Name .....

Attention or In care of .....

Street .....

City ..... State .....

Remarks .....
(Please indicate products sold or principal line of business.) 10-23-35

## Subscription Order

Business News Publishing Co.
5229 Cass Ave., Detroit, Mich. Date.....

☐ Enter my subscription to Electric Refrigeration News for one year (52 issues).
☐ Send the 1935 Refrigeration Directory and Market Data Book (2 volumes).
☐ Enclosed find remittance. (See rates above.)

Name .....

Attention or In care of .....

Street Address .....City and State.....

We sell the.....refrigerator and.....
(Please indicate other products or principal line of business.)
10-23-35

# QUESTIONS

## Specifications

*No. 2524* (Dealer, Maryland)—"Please furnish us with this year's issue of the ELECTRIC REFRIGERATION NEWS, listing the specifications for the refrigeration and air conditioning refrigerating units. We consider this information very valuable and of great asistance in sales work."

*Answer*: Specifications of commercial-size refrigerating machines were published in the April 3 issue but we have no extra copies in stock.

## Water Cooler Makers

*No. 2525* (Architect, New York)—"I would like very much indeed if I could procure from your company a complete list of companies in the United States making electric water coolers that are refrigerated."

*Answer*: Manufacturers of refrigerated electric water coolers are listed on pages 214 and 215 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

## Unit Sales Figures

*No. 2526* (Advertising Agency, Illinois)—"Could you furnish us figures or estimates of unit sales of household electric refrigerators and commercial refrigeration units for 1934 and 1935 to date?"

*Answer*: Figures of unit sales from manufacturers to distributors are as follows:

*Household*: Sales for the year 1934, 1,390,600; eight months' of 1935, 1,465,700.

*Commercial*: Sales for the year 1934, 116,400; eight months' of 1935, 91,075.

Sales reported are by manufacturers to distributing outlets.

## Ice Cube Extractor

*No. 2527* (Dealer, South Carolina)—"Please let me know whether there is on the market any device for extracting ice cubes from the trays used in domestic mechanical refrigerators. I am acquainted with the wedge shaped "ejector" used in the Westinghouse refrigerator. I am also familiar with the rubber trays used by some companies.

"I am particularly interested in any device that liberates the cubes by melting, as by the application of heat. If such a device has been put on the market I would like to know to what extent, what the retail price is, and by whom it is patented.

"If possible I would like to have a sketch of the device."

## Cabinet Manufacturers

*No. 2528* (Service Firm, New York)—"We will appreciate it very much if you will favor us with a list of companies manufacturing refrigerator cabinets."

*Answer*: Manufacturers of refrigerator cabinets are listed on pages 226 and 227 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY. This directory is published for the purpose of answering such questions, as it is impossible for us to prepare individual lists in answer to the thousands of requests for such information.

## Addresses

*No. 2529* (Manufacturer, New York)—"We would appreciate it indeed if you would kindly furnish us with the addresses of the following:

"The Journal of American Society of Refrigeration Engineers.

"The Journal of the Society of Heating and Ventilating Engineers."

*Answer*: The address of the American Society of Refrigerating Engineers is 37 West 39th St., New York, N. Y.; and the address of the American Society of Heating and Ventilating Engineers is 51 Madison Ave., New York, N. Y.

## Johnston Company?

*No. 2530* (Distributor, Pennsylvania)—"Please advise us if you know of any manufacturer in the refrigeration or air-conditioning business by the name of Johnston.

"If so, we would appreciate your advising us their exact name and address."

*Answer*: We do not know of any manufacturer in the refrigeration or air-conditioning business by the name of "Johnston."

However, a subsidiary of the Johnson Motor Co., Waukegan, Ill., operating under the name of Jomoco, Inc., manufacturers household condensing units, and the Johnson Service Co., 507 E. Michigan St., Milwaukee, Wis., manufactures temperature and humidity controls for air-conditioning systems.

## Service Manuals

*No. 2531* (Department Store, Texas)—"Please advise me where service manuals may be obtained for different makes of electric refrigerators.

"Would the bound volumes you offer in a recent issue of your publication cover the Kelvinator of 1928 and 1929?"

*Answer*: See below.

*No. 2532* (Reader, New York)—"I would like to inquire if you have a book containing diagrams and information on all makes of domestic refrigerators?"

*Answer*: The MASTER SERVICE MANUAL which we are now compiling will cover broadly the service operations on types and makes of household electric refrigerators now being sold in great quantities by the leading manufacturers.

Detailed instructions regarding the methods of handling each of the problems most commonly encountered in practical experience will be published in this book.

This manual will consist of a compilation of the series of articles by K. M. Newcum published in the weekly issues of ELECTRIC REFRIGERATION NEWS, together with other supplementary material.

The Newcum articles have appeared in 23 issues of ELECTRIC REFRIGERATION NEWS up to the present date. An outline of the material which has been published will be found on page 16. Also see coupon (on this page) for ordering the Manual.

## Clago Company

*No. 2533* (Dealer, Ohio)—"Can you furnish us with the name and address of the manufacturer of the "Clago" electric refrigerator?"

*Answer*: The Clago company was declared bankrupt in December, 1932, and the last known address of the company was 307 N. Michigan Ave., Chicago, Ill.

## Dodge Reports

*No. 2534* (Dealer, Georgia)—"Where can I secure 'Dodge' reports and similar reports on contemplated construction work in which refrigeration and air conditioning will be used? These reports will help me to keep in contact with the territory much better."

*Answer*: The F. W. Dodge Corp., which issues the Dodge reports on construction work, has an office at 313 Red Rock Bldg., Atlanta, Ga.

## Capillary Tubes

*No. 2535* (Manufacturer, Connecticut)—"I am interested in obtaining as much information as possible concerning the theory and operation of capillary tube controls, particularly with reference to domestic refrigerators. If you have published any articles on this subject in ELECTRIC REFRIGERATION NEWS, will you please let me have copies of those articles.

"Your advice as to any other sources of information will also be greatly appreciated."

*Answer*: The capillary tube was developed several years ago by the company which manufactured the Rice refrigerator which is no longer being made. Crosley is the principal user of this at the present time. Servel used it in its hermetic unit.

Published in pages one and two of the Jan. 10, 1934, issue of ELECTRIC REFRIGERATION NEWS was a story concerning the use of the capillary tube with the Crosley machine, and a service chart for capillary tube units.

For further information write Isaac Rice, Jr., 295 Fifth Ave., New York City.

## Electric Dishwashers

*No. 2536* (Dealer, Louisiana)—"We are anxious to make a connection as a dealer for electric dishwashers. Kindly give us the names of some factories making or distributing such appliances."

*Answer*: Write the following companies for information concerning electric dishwashers:

General Electric Co.
Specialty Appliance Sales Dept.
Nela Park, Cleveland, Ohio.

Westinghouse Electric & Mfg. Co.
Mansfield, Ohio.

The Conover Co.
3123 Carroll Ave., Chicago, Ill.

## Mexican Market

*No. 2537* (Manufacturer, Illinois)—"We are endeavoring to secure information relative to the refrigeration industry in Mexico. We have your market data books and have noted the information presented therein. Kindly advise us where further information may be gathered."

*Answer*: For further information on the refrigeration industry in Mexico you might write to Andrew W. Cruse, Chief, Electrical Division, Bureau of Foreign and Domestic Commerce, who is currently issuing the "Electrical Exports Handbook" which outlines the potential market for electrical products in many foreign countries.

## Majestic Service Data

*No. 2538* (Service Firm, Pennsylvania)—"Will you kindly inform us in which copy or copies of your publication an article or articles on repairing 'Majestic' hermetically sealed refrigerators appeared?"

*Answer*: This article appeared in the Aug. 16, 1933, issue of ELECTRIC REFRIGERATION NEWS.

# CLASSIFIED

RATES: Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

### POSITIONS AVAILABLE

A NATIONALLY KNOWN manufacturer requires a responsible manufacturers' agent or salesman with commercial refrigeration selling experience. Should have following with show case, beverage and water cooler manufacturers and chain grocery stores. Excellent opportunity to connect with one of the oldest and most responsible manufacturers in the industry. State in detail, experience, past affiliations, age, etc., and attach photograph. All applications will be held confidential. Box 735, Electric Refrigeration News.

### FRANCHISE WANTED

NEW YORK CITY service company desires manufacturer's service agency. Completely equipped shop, employing armature winders and machinists. Capable of doing any kind of repairs. Competent outside men. Well established; reliable. Can furnish highest recommendations. Invite investigation. Box 736. Electric Refrigeration News.

### EQUIPMENT FOR SALE

NEW six hole double ice cream cabinets, portable type, complete with ⅓ HP new compressor units less motors. Size 30"x30"x60", at $85.00. Cabinet only at $60.00. New Penn thermostats, $4.00. Rebuilt and guaranteed 1 HP Frigidaire units complete with motors, $95.00. ½ HP at $65.00. All prices FOB our store. New Larkin, Bush, Frigidaire coils less than half price. Pioneer Refrigeration Equipment Co., 33 Warren St., New York City.

ISOBUTANE: We offer purest and dryest Isobutane for the most exacting scientific purposes; in your 80 lb. cylinders at $0.75, in our 120 lb. cylinders, $0.70, in small lots at $1.00 per pound. The Standard Refrigeration Co. of Pittsburgh, 1138 Dohrman St., McKees Rocks, Pa.

### PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

### REPAIRS

HALECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn, Ranco, Tag., etc. Expansion valves repaired. Gas service, Ethyl, Methyl, Iso-Butane, Sulphur. Your cylinder or ours. Competitive prices. Halectric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

### HERMETIC UNITS REPAIRED

GENERAL ELECTRIC SEALED UNITS—repaired, rebuilt, exchanged. Guaranteed service. Our modern shop is especially equipped to efficiently repair these units. Prices low and workmanship the best. Give model number when writing. Immediate service. Rex Refrigeration Service, 446 East 79th St., Chicago.

### SCHOOLS

REFRIGERATION—AIR CONDITIONING (a.c.) Theory and practice taught thoroughly by our course combining class room and laboratory work. Our course teaches installation, servicing, estimating and engineering sales. Resident School. Inquiries or inspection invited. Part or full time courses, day or evening classes. Detroit School of Refrigeration, (a.c.) 6517-6519 Grand River, Detroit, Mich.

**MAN POWER**

MAN POWER is one of the most important problems of your business. You need men who know what to do and how to do it.

We perform a definite service in the refrigeration field . . . supplying MAN POWER to the industry. We train men in all phases of installing and servicing refrigeration equipment. We train men to become useful, permanent members of the industry. You will find U. E. I. graduates occupying some very important positions in leading manufacturing, distributing, and servicing companies. We solicit inquiries from those desiring the services of trained men or personal training.

Ninth Year

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